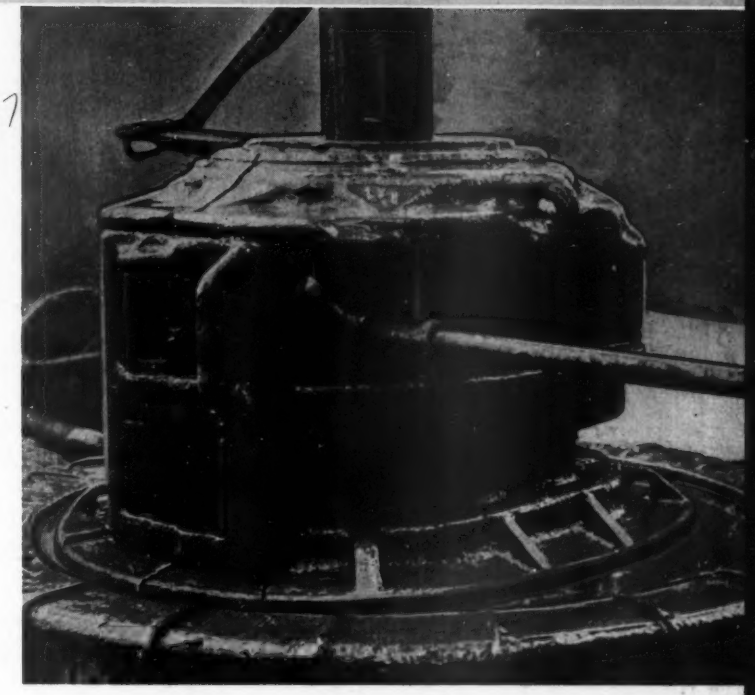
JUN 9 1943

the OIL AND GAS JOURNAL

SETTING CASING?



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1 — It grips *instantly* and *positively;*

2 — It operates *rapidly* and *easily;*

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The body is made of alloy steel, completely heat treated, the two halves being hinged with a strong pin at rear, and joined by a stirrup-type latch with safety latch in front. This latch cannot be opened while slips are engaged on casing.

A single lever operates the four extra-long slips which are "floated" on springs and so perfectly balanced that they grip uniformly. When running casing, the lever is lowered to retract all slips, and a top guide plate keeps the casing from dragging across the slips and dulling them.

Slips are 18 inches in length, with teeth which grip instantly and positively without crushing or bottlenecking the casing, even when the string is extremely long and heavy. Designed with a flat back, the slips have the same gripping action regardless of their vertical position in the body, and do not stick.

View below shows how slips of another size are installed by removing and replacing only one bolt, without disturbing any operating mechanism. Other details are on pages 575-577 of the 1942 Composite Catalog, or in your copy of the BJ Catalog No. 42 gladly sent upon request.

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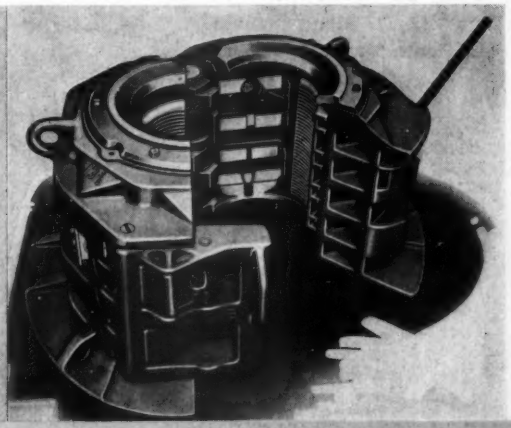

BJ CASING SPIDER

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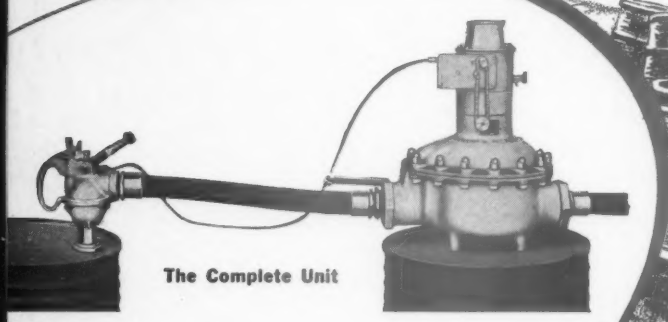


The Complete Unit

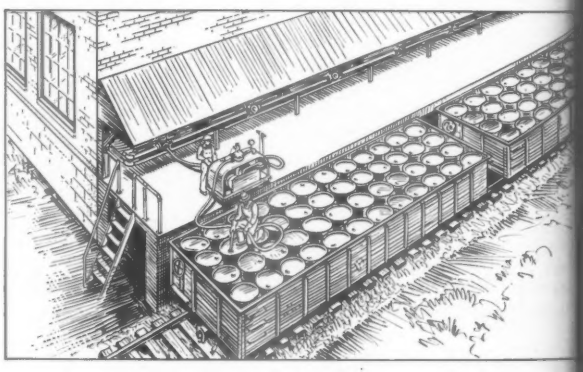
Consists of an Empire oscillating piston, positive displacement meter; a thermostatic microset for automatically correcting the meter measurement to the exact equivalent of the desired volume at 60°F.; a repeat register with exterior mounted quantity chain having a fixed cam thereon which trips a mechanically operated control valve with non-foaming dripless nozzle of integral construction.

Fill Drums ACCURATELY and RAPIDLY with the

EMPIRE *Thermostatic* DRUM FILLER

DRUMS to the rescue, on the war front and the home front! The unprecedented demands for gasoline and oil, the shortage of tankers and the danger of submarine attack on slow-moving, cumbersome ships, have all combined to place important emphasis on drummed fuels.

With the Empire Thermostatic Drum Filler, these drums of war can be speedily, accurately filled. The exclusive portable feature permits bringing the filler to the drums, rather than the drums to a central filling point. Accuracy is certain, since the automatic thermostatic control assures that the drumming is done to the exact equivalent of the desired volume at 60° F. Entirely automatic operation without manual control provides a new high in speed of filling. Measurement by the time-proven Empire Oscillating Piston Meter is always accurate. Chain cam-operated control permits rapid change from one predetermined delivery amount to another, by simply substituting the proper length quantity chain on the unit. Chains in delivery cycles of from 5 to 100 gallons can be furnished.



The sketch above indicates the manner in which a large mid-western refinery is speeding up drum filling through use of the Empire Thermostatic Drum Filler. Gondolas containing empty drums are spotted along the loading platform and the drums are then filled without removal from the cars. The Drum Filler is mounted on a hand truck for easy portability. Conveniently spaced outlets from the pipe-line along the platform wall, controlled by Nordstrom three-way valves, permit quick hookups to be made at any location. This same system can also be used for filling rubberized cells in box cars.

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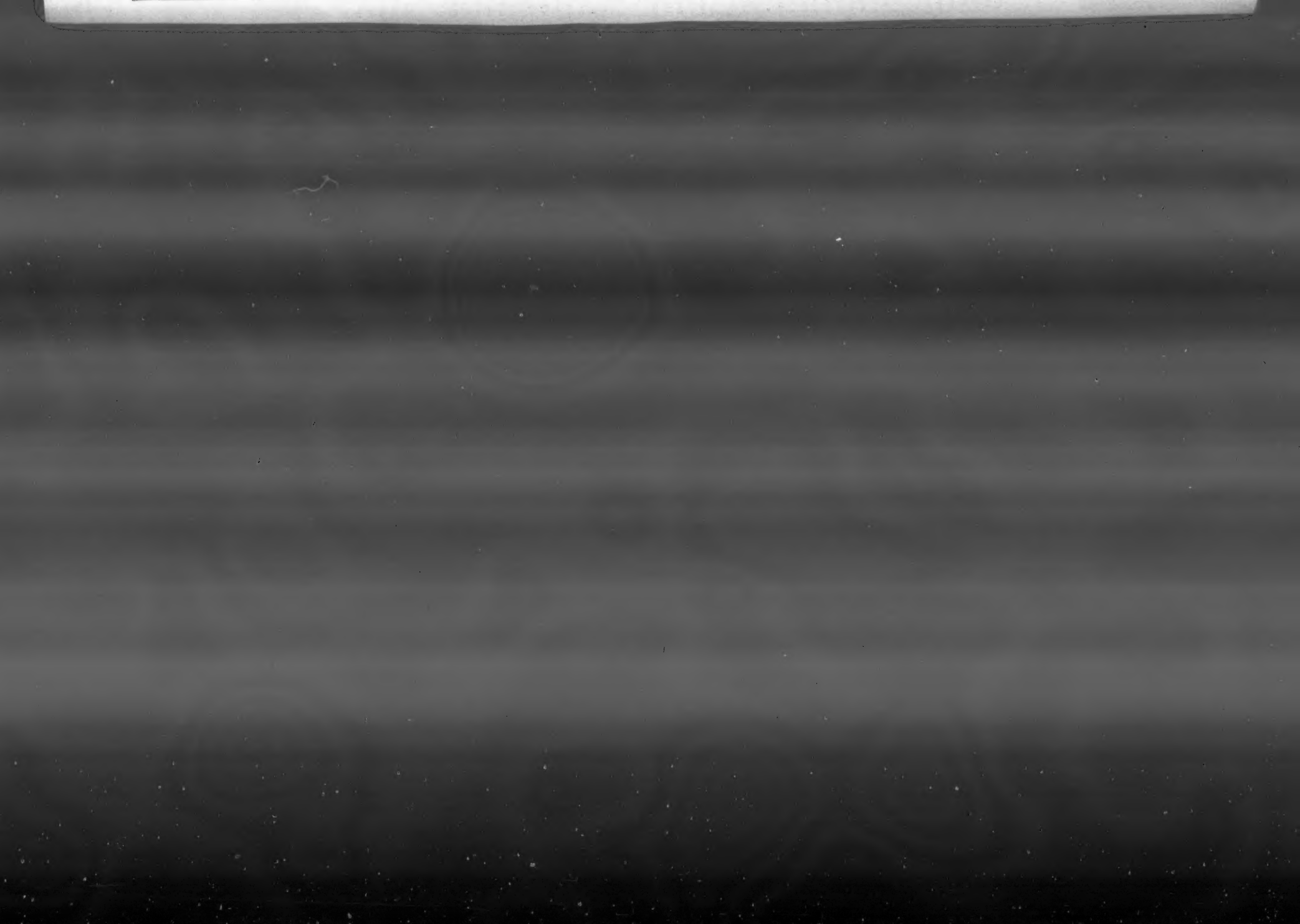

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General Heading: **BAKER CEMENT WASH-DOWN WHIRLER FLOAT SHOE**

BAKER OIL TOOLS, INC.

Main Office and Factory:
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Export Sales Office:
19 Rector Street, New York, N. Y.

Unit No. A-27

Subject:

Securing Successful Cementing Results the First Time.

Index: 250.1

Date: June 3, 1943

Page: 1

★ ★ ★ ★

Today, a successful first time cement job is not merely desirable . . . it's a "must." Our war needs demand that to conserve vital materials and precious time, *no job* shall be done a second time if it can possibly be avoided.

Baker's contribution to this essential war need is making available cementing devices which afford best possible assurance of *doing the job right and doing it the first time.*

One such device, the Baker Cement Wash-Down Whirler Float Shoe, is illustrated at right. Study it and you will understand why operators who recognize the importance of securing a first time successful cement job, specify "BAKER."

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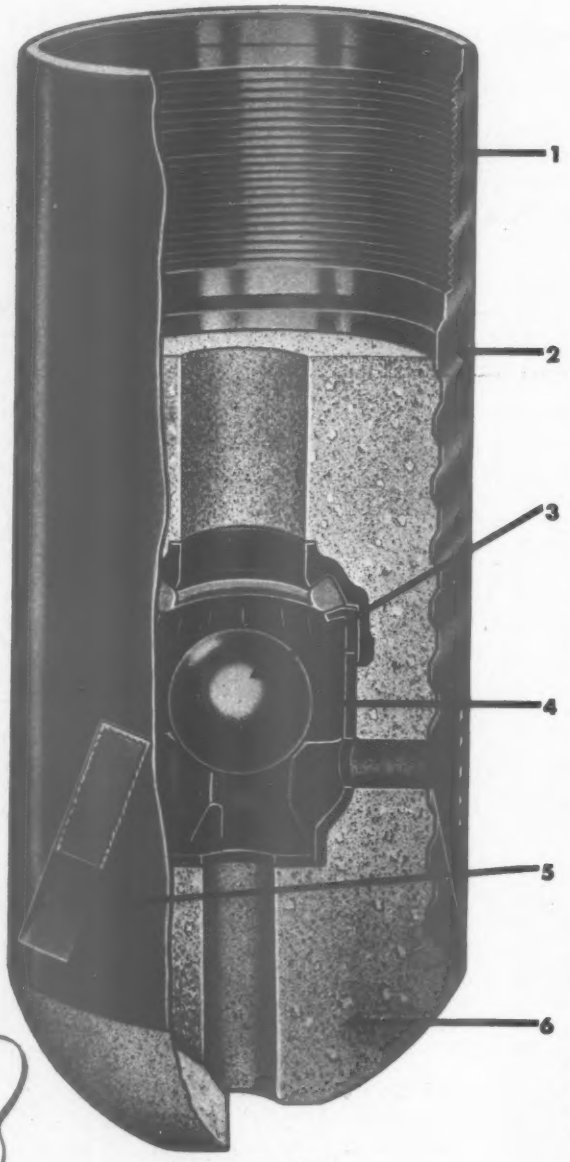
Service Note

Competent Baker men will service, make suggestions, and otherwise assist in securing best possible results.



Product No. 120

Baker Cement Wash-Down Whirler *Float Shoe.

*(The Baker Wash-Down principle is also available in a Guide Shoe.)

1. **THREADED CONNECTION FURNISHED TO FIT ANY TYPE CASING.** Baker Floating Units can be furnished with threaded connection to fit the specifications of your casing. (Float collars can be furnished with both "female" and "male and female" threaded connections. Manufacturing precision assures thread uniformity and accuracy.

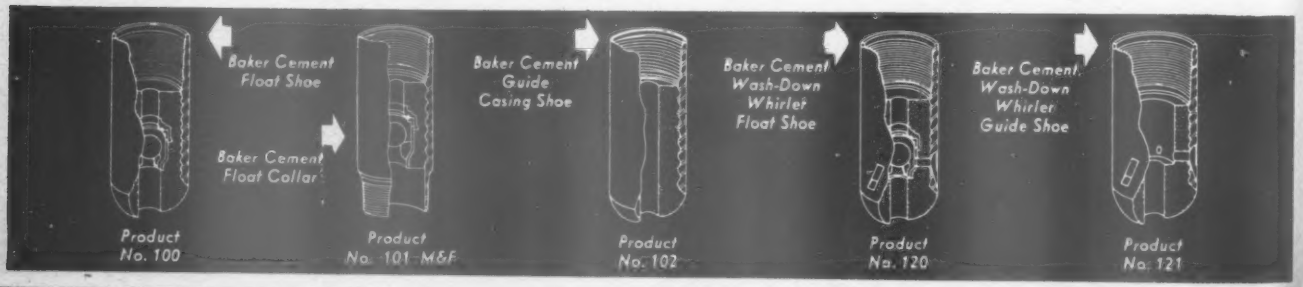
2. **AMPLE STRENGTH.** The seamless steel casing shoe into which the concrete plug and plastic BALL-TYPE Valve Assembly are securely anchored, provides a unit that has the STRENGTH to float the longest and heaviest string of casing with an ample factor of SAFETY.

3. **POSITIVE, LEAK-PROOF BACK-PRESSURE VALVE.** The buoyant Plastic BALL-TYPE Back-Pressure Valve floats in the cement slurry or rotary mud and instantly forms a leak-proof double seal against a narrow, tough rubber ring (backed by Plastic and concrete) at the slightest reversal of pressure. Here is Valve efficiency at its best.

4. **AMPLE CIRCULATION AREAS.** The correctly designed, streamlined Valve Assembly provides passageways ample for any circulating or cementing operation . . . a fact attested to by actual field performance under the most severe operating conditions.

5. **BAFFLED WHIRLER PORTS.** These whirler ports provide the important wash-down whirler action so advantageous in circulating and cementing operations. When the fluid strikes these baffled ports, a downward and then an upward whirling motion results. In running in, this whirling action provides a means of effectively washing away bridges. During cementing, the whirling action, imparted first to the fluid preceding the cement slurry and then to the slurry itself, properly prepares the hole to receive the cement. It then assures best possible distribution of a uniform body of cement around the shoe and the shoe joint, reducing the hazard of channeling to a minimum. Here is the ultimate in cementing efficiency.

6. **EASY DRILLABILITY.** Complete and easy drillability results from the internal construction of Baker-Formula Concrete and Plastic . . . the Plastic BALL-TYPE Valve Assembly being set on end in the concrete plug to present a minimum cross-sectional area to the drilling bit. The concrete and the Plastic are quickly and easily drilled up and circulated out of the hole.


Baker Cement Float Shoe
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Baker Cement Wash-Down Whirler Guide Shoe
Product No. 121

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Trends

Crude-Oil Production
By States — Page 71

CRUDE PRODUCTION 3,982,015 bbl. daily average—down 14,685 bbl. One year ago 3,903,800 bbl.

CRUDE STOCKS 243,660,000 bbl. as of May 22—up 2,203,000 bbl. One year ago 253,423,000 bbl.

GASOLINE STOCKS 85,166,000 bbl. as of May 22—down 1,784,000 bbl. One year ago 97,021,000 bbl.

RESIDUAL FUEL-OIL STOCKS 67,717,000 bbl. as of May 22—up 406,000. One year ago 79,296,000 bbl.

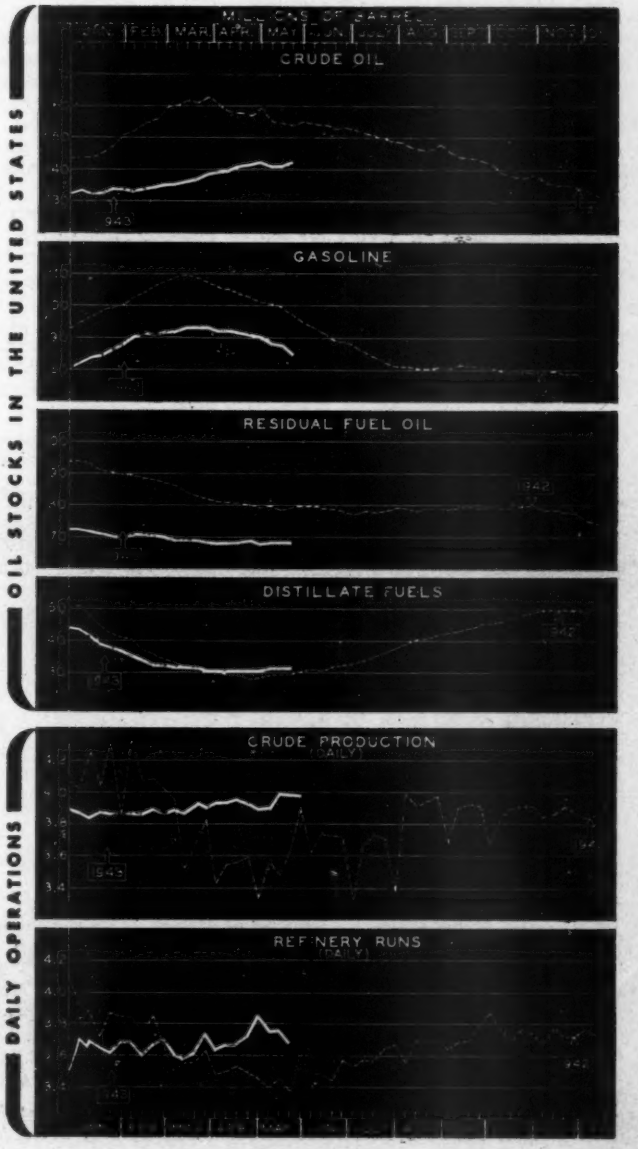
GAS OIL AND DISTILLATES 32,193,000 bbl. as of May 22—up 302,000. One year ago 23,658,000 bbl.

REFINERY RUNS 3,698,000 bbl. daily week ended May 15—down 70,000. One year ago 3,392,000 bbl.

DISCUSSIONS at Washington and within the industry reveal considerable difference of opinion as to the probable future trends in domestic crude-oil production and refinery operations for the last 6 months of this year. For example it is known that operations as projected by representatives of the war agencies are substantially less than the output that has been recommended as necessary by the economics committee of PIWC. It has been estimated by representatives of the industry that the demand for domestic crude oil by the last quarter of this year will be around 4,300,000 bbl. daily without stock reductions. This estimate is based on civilian demands in line with the present rationing programs including available estimates as to military requirements.

IT is understood that the war agencies do not expect the industry to expand the crude-oil production and refinery operations projected as necessary by the industry's economists. Washington takes the position that it is not practical for domestic producers and refiners to increase operations to take care of an expansion of 200,000 to 300,000 bbl. daily in over-all requirements. This position takes into consideration the restricted transportation facilities, the quality of the crude oil, the decreasing crude-oil output in areas where the supplies are most needed, and the fact that most refineries except for two areas are now operating near capacity.

THESE government representatives point out that the only way operations could be increased 10 per cent would be to expand drilling in proven areas which are not now completely developed, build additional pipe lines and also authorize the construction of new topping and cracking facilities at a number of refineries regardless of whether or not they are engaged in the production of war products. This would have to be done quickly and would involve the use of critical materials which, it is claimed, are not now available. The Government's program as a substitute for substantial expansion includes a further reduction in what is termed "nonessential civilian uses" as the output of 100-octane gasoline and other war products increase from month to month over the remainder of the year. It is also suggested that it may be possible to draw more heavily on supplies from the northern tier of South American countries and the adjoining refineries of the Caribbean later in the year. These operations have been curtailed approximately 50 per cent in recent months.



District 2 Refinery Quotas Raised, Higher Gasoline Yield Authorized for Some

WASHINGTON, D. C.—June refinery quotas set by the Petroleum Administration for War in District 2 provide for increased production of gasoline west of the Mississippi River to supply farming operations locally while refineries east of the Mississippi are required to continue high yields of fuel oil. Total authorized crude runs for District 2 are 1,150,000 bbl. daily for June since it is understood industry committees convinced PAW an additional 50,000 bbl. of crude could be made available. Under the June quotas, war-products refineries are to obtain all crude necessary for maximum production. Refineries making asphalt and coke have their quotas increased from 80 per cent to 90 per cent of the formula figure for normal operations. Refiners west of the Mississippi River may increase their gasoline yields from 85 per cent to 90 per cent of normal during June provided this will not result in excessive inventories or require additional tank cars.

Under the modified District 2 program, war products refineries would be sure of obtaining 100 per cent of their crude requirements (in other words, minimum requirements for maximum war production) or 90 per cent of normal, whichever was larger. Another group of refineries, those engaged primarily in asphalt and coke operations, would have a quota of 90 per cent of normal. A third group, known as nonwar plants, would have operating quotas also of 90 per cent of normal.

"Normal" is defined as the basis existing from July 1, 1941, to December 31, 1942.

The action by the District 2 committee was taken in turn on the basis of findings of its statistical subcommittee, which found that the available crude supply for this area was approximately 1,150,000 bbl. daily, instead of 1,098,302 bbl. which was the May quota fixed by PAW.

The general committee held that refinery runs in this district should be not less than the available supply, including a reasonable reduction in stocks. It was stated that of the estimated 65,000,000 to 68,000,000 bbl. of crude stocks in the district, probably not more than half was actually required for working needs, leaving a large quantity to be used, at a suggested rate of 30,000 bbl. a day for the time being.

June refinery quotas for District 1 have not been set because of the disruption in transportation conditions but PAW has instructed refiners to adhere to their May quotas as closely as possible.

Coffeyville Army Air Field Photo—Acme

Refineries as well as pipe lines suffered from the recent Middle West floods. Tanks of National Refining Co., Coffeyville, Kans., were half submerged by waters from Verdigris River

Complete Regulation Imposed on Gasoline Traffic in District 3

WASHINGTON, D. C.—Distribution of gasoline is restricted in District 3 similar to the systems already operating in Districts 1 and 2, by Directive 67 issued by PAW affective June 1.

District 3 is divided into 11 zones and distribution of gasoline is subject to direction by the supply and distribution committee. The purpose is to supply local requirements from the nearest source and with the most efficient use of transportation.

The order is designed to eliminate cross hauling, substitute pipe-line movements for rail, barge and truck delivery where possible; free all possible transportation facilities to move gasoline eastward and northward, and increase concentration of supplies available for shipment to the East Coast.

Text of Directive 67, giving PAW control over movement of motor fuel is District 3 starts on page 22.

Exchanges and loans of products made compulsory by Directive 67 are accepted in theory by the industry as an emergency measure. Reluctance to institute the complete regimentation of distribution operations required by the directive is based on the fear of some oil men that government action may be taken after the emergency passes for violation of the antitrust laws. The directive, however, issued under the war powers of the executive department, is considered ample protection against legal reprisal.

Directive 67 is more specific in regulating movement of products from District 3 refineries to the ultimate consuming territory than orders either in District 1 or 2.

Operating Chart of Industry Next 9 Months

Calls for Increases in All Branches

by Henry D. Ralph

WASHINGTON, D. C.—A working schedule for the oil industry for the entire United States for the balance of this year and first quarter 1944 was presented to the PIWC this week by its committee on petroleum economics.

The committee has arranged for three members of its working subcommittee to obtain confidential information on military demands which should make future forecasts more accurate. The current report was without benefit of this information but the committee called attention of military authorities to its estimates of exportable surpluses beyond domestic rationed demand.

Here are the goals to which the oil industry must aim for the fourth quarter of this year, if the analysis of demand made by the PIWC is followed: Crude runs to stills, 4,150,000 bbl. daily; production, 4,155,000 bbl. daily with 179,000 bbl. per day stock liquidation, or 4,351,000 if inventories are sustained. Crude runs to stills must rise 280,000 bbl. daily in first quarter of 1944, compared to this month, with 225,000 bbl. of the increase recommended in District 3.

Committee Analyzes Demand

In summarizing its forecasts, the committee said:

"It is estimated that total domestic and export demand in the fourth quarter of 1943 will be 320,000 bbl. daily greater than during the corresponding period of 1942. This increase in demand applies to Districts 1 and 5, as small declines are indicated in the other areas. These figures assume that all oils available for export will be lifted and that local rationed demands will remain relatively constant.

"It is anticipated that crude runs to stills will be 4,150,000 bbl. per day in the fourth quarter and nearly 4,200,000 bbl. per day in the first quarter of 1944, compared with approximately 3,900,000 bbl. per day at the present time and 3,718,000 bbl. in the fourth quarter of 1942.

"In order to meet demand and the indicated stock schedules, an increase in crude production is indicated to 4,155,000 bbl. daily in the fourth quarter of 1943, compared with 3,984,000 in recent weeks and 3,880,000 in the fourth quarter of 1942. Even with this rate of production, crude stocks will decline 179,000 bbl. daily in the fourth quarter. Crude production required, if there were no change of crude or product stocks during the fourth quarter of this year, would have to be 4,351,000 bbl. daily compared with required crude production of 4,044,000 for the corresponding period in 1942, and 3,768,000 currently. This emphasizes the magnitude of the crude-production problem.

"While total stocks of all oils will be 496,000,000 bbl. at the end of 1943, or approximately the same as at the beginning of the year, this program indicates a decrease of 22,000,000 bbl. in crude stocks and a desirable complementary gain in product stocks.

"The following specific comments are offered from the standpoint of the individual industry functions:

"In regard to demand, the estimates of gasoline consumption outside of District 1 are based upon the continuation of rationing in accordance with the Baruch report. In District 1, the estimates are based upon a continuation of present coupon values and the resulting trend in gasoline consumption. No allowance has been made in the forecast for the recent reinstatement of the ban on pleasure driving or restrictions on truck and bus consumption on the assumption that these are temporary measures.

Fuel-Oil Outlook

"Kerosene and distillate fuel-oil demands have been estimated on the basis of the present extent of rationing over the period. No further conversion of distillate burners to coal has been assumed.

"Residual fuel-oil demand has been estimated on the basis of no further conversion to coal in District 2, while in District 1 conversions have been assumed to increase to a total of 50,000,000 bbl. annual equivalent of fuel-oil consumption by the end of 1943 from the present figure of approximately 44,000,000 bbl.

"Due to increasing transportation available to District 1 over the period, supplies will exceed even next winter's peak rationed-civilian demand. Thus the extent of rationing and the questions of further conversions and District 1 stock schedules are controlled entirely by the extent of military requirements. The data available in the subcommittee's report on the estimated availability of supplies for military use on the foregoing assumptions as to rationing and conversion and stock schedules are called to the attention of the proper authorities dealing with these policy questions.

"The following estimates of supplies available to District 1 are based on PAW estimates of available transportation. They are slightly lower than previous estimates.

ESTIMATED SUPPLIES AVAILABLE TO DISTRICT 1

(All figures in thousands of barrels daily)

	June 1943	3d Q. 1943	4th Q. 1943	1st Q. 1944
Tank cars	934	858	862	792
Private pipe lines	204	204	201	197
WEP lines		165	285	34
Barges and ocean tanker	201	249	218	176
Local production	66	64	61	58
Total supplies	1,405	1,540	1,627	1,577

Effect of Products Line

"It is assumed that 71,000 tank cars will continue in District 1 service and the amount which they will deliver has been adjusted from the base figure of 934,000 bbl. daily in June according to the projected shifts in source of supply and weather conditions. A very sharp decline in tank-car deliveries to District 1 to 792,000 bbl. daily in the first quarter of 1944 is indicated due to the completion of the 20-in. line to the East Coast, which forces tank cars to be put back into longer haul service from District 3.

"With regard to pipe lines, it has been assumed that the 24-in. WEP will begin deliveries directly to District 1 at 175,000 bbl. daily in August and will operate at full capacity of 300,000 bbl. daily beginning with September. It is estimated that winter weather will reduce throughput of the line to 270,000 bbl. daily in the first quarter of 1944. PAW advises that it is now planned to operate this line entirely on crude oil, whereas it had been planned previously that the line should handle 125,000 bbl. daily of heating oil and 175,000 bbl. of crude. According to PAW estimates,

the 20-in. line will deliver 50,000 bbl. daily of kerosene and 75,000 bbl. of distillate to District 2 from October 1943 through January 1944 for transshipment to District 1, and the same quantities to District 1 beginning with February 1944. When all pump stations are placed in operation on the line, it is anticipated that it will ultimately deliver 235,000 bbl. daily of gasoline, but the date for this is still uncertain.

"In regard to refining, the figures indicate an increase in runs to stills in the first quarter of 1944 compared to June 1943, of 280,000 bbl. daily for the United States, of which 225,000 bbl. is in District 3. This increase will be primarily in plants installing new facilities for essential war products. Recent large demands indicate that consideration should be given to immediate increases in crude production and crude runs in District 3."

The committee pointed out that while total United States crude production must increase there will be declines in Districts 1 and 2 and production in Districts 4 and 5 will remain at about present levels. In District 3, even assuming heavy reduction in crude stocks, production must be increased to between 2,250,000 and 2,300,000 bbl. daily compared with less than 2,100,000 bbl. at present. The committee recommended immediate construction of the pipe line from West Texas to District 2 to meet increasing requirements of Midwest refineries.

Case, Faust New Socony Directors

NEW YORK.—John Crowther Case, manager of the foreign producing department, and Walter Livingston Faust, vice president and eastern sales manager, were elected directors of Socony-Vacuum Oil Co., Inc., at its annual meeting this week.

Mr. Case, a native of Rochester, N. Y., and son of the late Howard B. Case who was manager of Vacuum Oil Co., Ltd., in London, has been with the company since 1912. He returned to this country in that year after spending much of his youth in Europe where he attended school in England and studied engineering in Switzerland for a year. He was first employed in the accounting department of Vacuum Oil Co. in Rochester.

Two years later he moved to the manufacturing department where he served in various capacities and then was transferred to 61 Broadway, then Vacuum's headquarters, to assist in brand and formula work. He was commissioned a lieutenant in World War 1 after enrolling in the first officers training camp at Madison Barracks, N. Y., and saw service in France for several months. On his return to the company in 1919 he was assigned to the manufacturing department and in 1920, when the producing department was formed, became assistant to the manager.

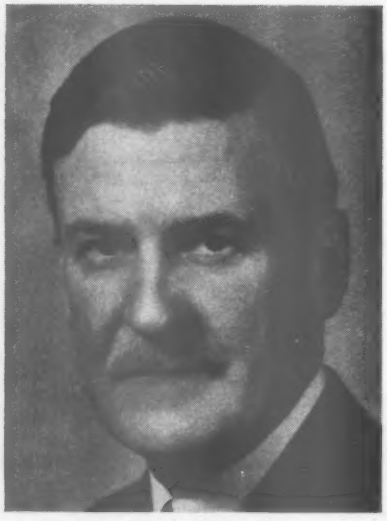
In 1925 Mr. Case went to Europe to head the European producing operations with offices in Vienna. He returned in 1927 as assistant to W. C. Brower, C. W. Hadley and, after formation of Socony-Vacuum Oil Co., Inc., to A. F. Corwin. He was made manager of the foreign producing department in 1937.

Mr. Case is well known as a skier and mountain climber and is counsellor of the American Alpine Club. He is married and lives in Morristown, N. J. One of his two children is now in the U. S. Army in mountain training in Colorado. Mr. Case is a trustee of the American College, Beirut, Syria.

Mr. Faust was born in Bryn Mawr, Pa., August 4, 1895. He graduated from Stevens Institute of Technology, Hoboken, N. J., in 1921 after interrupting his education to serve in the coast artillery, where he attained the rank of first lieutenant, during World War 1. He was first chief engineer and later sales manager for Whitlock Cordage Co. In 1929 he went to Vacuum Oil Co. as domestic sales manager of the marine sales. He was made general manager of marine sales after the merger of Vacuum and Standard Oil Co. of New York and in 1935 also undertook direction of aviation sales activities. In 1938 he became eastern sales manager in charge of operations for New England, New York, New Jersey, Pennsylvania and Delaware.

Mr. Faust is married and resides with his wife and two daughters in Summit, N. J. His outside interests include boating and playwriting. He is a member of the New York Yacht Club and one of his plays, "The Rock," was produced in New York this year.

JOHN C. CASE



WALTER L. FAUST

New Plant Authorized

John A. Brown, president, told stockholders that the first of seven T.C.C. units which the company is installing is expected to be in operation in August. He also announced the authorization for the erection of a plant to produce the new synthetic, bead catalyst has been received from the Government. He disclosed the fact that the company is spending $3,400,000 annually on research, employing 900 persons in four laboratories. He foresaw the possibility that "our country will need large imports of crude oil or products and perhaps before long it will be necessary to undertake making oil products from coal or oil shales" if the industry does not continue to make large new discoveries. "Since the first of the year we completed a well in West Texas at 10,700 ft. which is a good indication of a promising new field."

Oil Company Librarians Meet at New York June 22-24

NEW YORK.—Librarians of oil and oil engineering companies, and research organizations will meet at the second Wartime Conference of the Special Libraries Association at the Hotel Pennsylvania, New York City, on June 22-24. Fifty-five companies in the oil industry are represented in the petroleum section of the Science-Technology Group, which includes in addition, chemical, rubber, utilities and aeronautical libraries throughout the country.

THIS WEEK

REFINING—Crude quotas for District 2 plants increased 50,000 bbl. daily in June. . . . District 2 refiners east of Mississippi authorized to increase gasoline yield, to 90 per cent of normal. . . . ¶Gasoline yield in March from all refiners declined to 35.8 per cent on crude charged, lowest "modern" level. . . . ¶Alternate test method approved by Army, for 91-octane gasoline. . . .

TRANSPORTATION—Schedule of 297,000 bbl. of crude daily through WEP line set up as PAW objective, for June, July and August. . . . Goals set for sellers at Longview, for recipients on East Coast. . . . ¶Tank-car deliveries to East Coast slump to 884,768 bbl. daily, first week of floods. . . . Rails had delivered 900,000 bbl. daily, or more, since week ended April 3. . . . ¶About 600 miles of WEP eastern crude-line extension completed. . . . ¶Eastern oil movement will be cut 20 per cent, until normal routings are reestablished. . . .

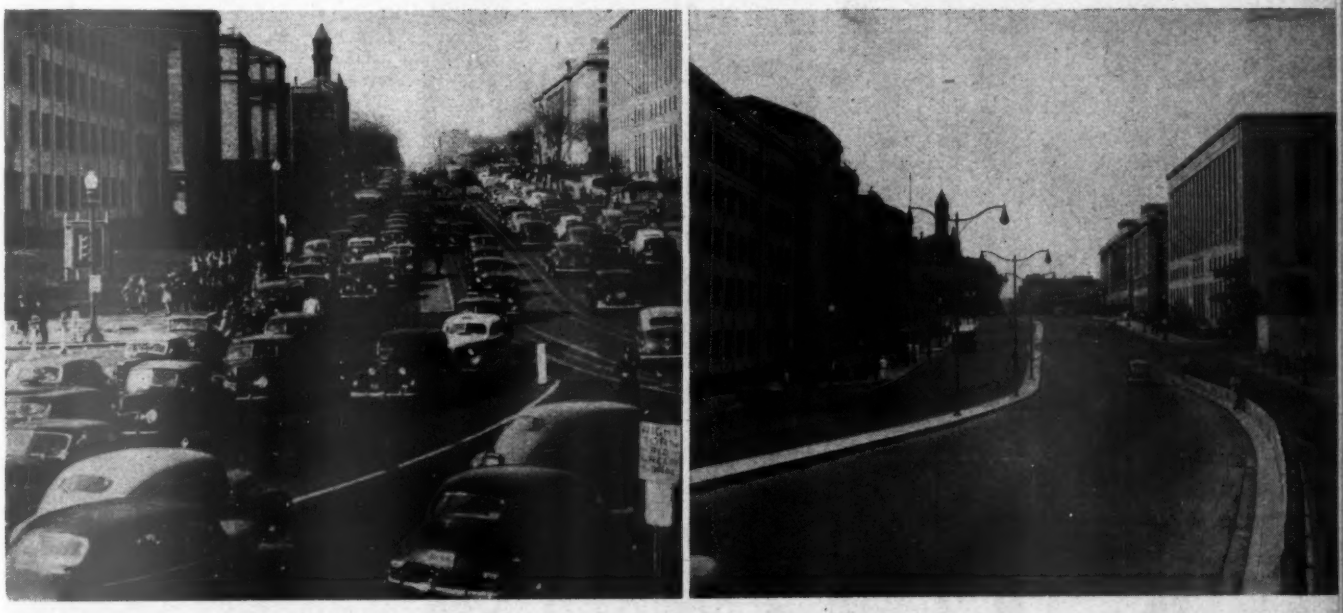
SUPPLIES—Eastern stock index recedes to 26.8 per cent of normal. . . . ¶Complete control over District 3 gasoline distribution assumed by PAW. . . . ¶District 2 refiners will draw on storage for about 30,000 bbl. of crude daily, this month. . . . ¶Priorities may be issued for East Coast consumers. . . . Suppliers favor specific direction, fear post-emergency possibilities of government reprisals, in form of antitrust actions. . . .

DEMAND—Rise of 320,000 bbl. in daily domestic and export demand in fourth quarter, over a year ago, predicted by PIWC. . . . Most of increase will be in Districts 1 and 5. . . . ¶Crude runs to stills last 3 months need to be 4,150,000 bbl. daily, up 250,000 from present level. . . . ¶Substantial rise needed in District 3 production, to satisfy new manufacturing capacity coming on stream. . . .

MARKETS—Another moderate adjustment, averaging 5 cents per barrel, approved by OPA, on Talco and Sulphur Bluff crude ceiling. . . . ¶Reply of PIWC to OPA's rejection of general advance due, in near future. . . . ¶All products firm, mostly at ceiling levels. . . . ¶Few refiners have surplus stocks of any product. . . . Interrefinery buying efforts mostly unsuccessful. . . .

MATERIALS—Information clinics, conducted by PAW representatives, confirm blanket scope of P-98-b. . . . Covers 98 per cent of industry's supply requirements. . . . Familiarity with order enhancing acceptance by operators. . . . Transition period from PRP to CMP to last probably 3 months, less for some items, longer for others. . . . Generally speaking, procurement procedure is substantially simplified. . . .

RATIONING—Talk subsides of tightening restrictions in Middle West. . . . Modulation does not necessarily remove threat. . . . But indicates government authorities painted darkest picture possible of transportation disruptions, for self-protection, face saving. . . . ¶Buses and taxicabs in northeastern area cut 20 per cent, deeper slash in store, so ODT warns. . . . ¶Ickes issues instructions for preferential treatment of nonhighway-farm requirements. . . .



These before and after pictures, both looking north up Fourteenth Street from Maine Avenue, Washington, D. C., should dispel all doubts as to effectiveness of rationing and the ban on pleasure driving. The congested-traffic shot was taken during a normal spring afternoon and the other was taken May 23

Inspection Confirms Magnitude of Plants On Gulf Coast Producing War Materials

by Arch L. Foster

BATON ROUGE, La.—Capacities of butadiene and of synthetic rubber combined, totaling 80,000 tons per year, were inspected here May 31 by a party of Washington officials led by William M. Jeffers, rubber director, and Robert Patterson, undersecretary of war.

At the same time an undisclosed but obviously huge capacity for aviation fuel and its components, including sulfuric acid alkylation, hydrogenation, polymerization, catalytic cracking, and other processes were also inspected by the party included in the joint war agencies inspection trip which this week continues on its tour of Gulf Coast war-products plants.

One of the outstanding events of the inspection trip here was that of looking over the new 30,000-ton per year buna-S plant of the Copolymer Corp., the first of the wholly government-owned synthetic tire rubber plants to be completed and placed on stream. This plant, processing butadiene from its own unit, from the nearby Standard Oil Co. of Louisiana production, and styrene from a plant already operating not far away in Texas, went on full stream last week and is operating at scheduled capacity according to its local officials. This area is of major importance not only in the war-products program as one of the areas where concentrated output is centered, but also is a center where many of the present petrochemical developments had their beginnings.

Nearby, is the largest plant in the world for making tetraethyl lead, a plant which obtains ethylene, one of its intermediates, from the Standard of Louisiana refinery. Other plants involved in petrochemical production for war or otherwise are in the same general area.

Completion of all its commitments to Government for the construction of butadiene plants at Baton Rouge, La., for manufacturing raw material for buna-S synthetic rubber, is represented by facilities inspected here as a fifth plant in the southern city was put in full operation. The fifth plant is the first large government-financed plant of this type to be finished and placed in operation by the oil industry.

The five butadiene plants at the refinery of the Standard of Louisiana, subsidiary of Standard Oil Co. (New Jersey), have an annual capacity sufficient to make several millions of automobile tires.

Of the five plants, two were financed entirely by Standard of New Jersey, another is owned by Defense Plant Corp., and two others were built or equipped cooperatively by the company and Government. All told the company has invested $12,050,600 in these plants and the Government $11,507,000.

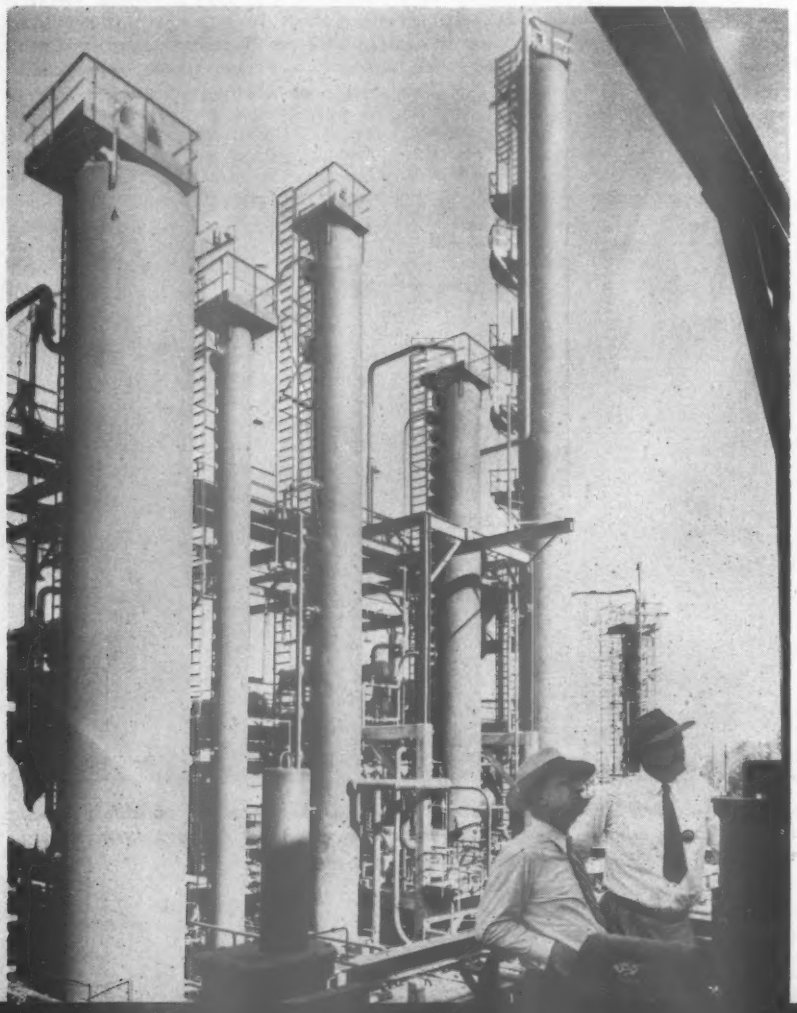
Buna-S rubber is the backbone of the Government's synthetic rubber program, and butadiene is its basic raw material.

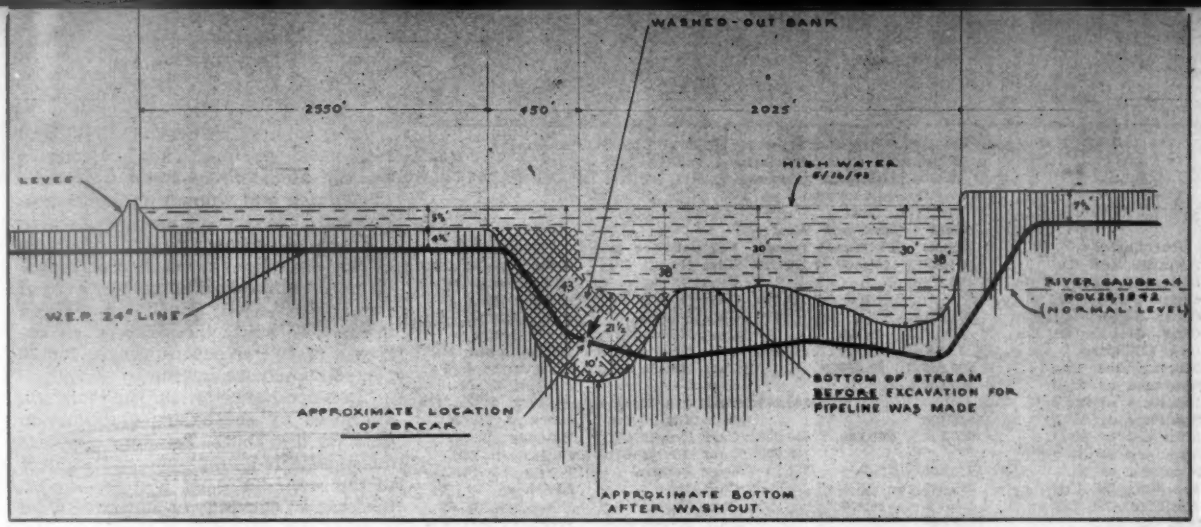
The company said that the five plants at Baton Rouge employ two types of process for manufacturing butadiene—one process by which butadiene is made by straight cracking of oil and the other a process for making it from butene, a refinery gas.

"The completion of the fifth butadiene plant at Baton Rouge is a milestone in the synthetic rubber program," Standard pointed out, "It means not only that we have fulfilled our commitments to Government for construction of butadiene plants at

(Continued on Page 24)

M. W. Boyer and M. J. Rathbone, vice president and president, respectively, Standard Oil Co. of Louisiana, inspecting the final unit in the company's commitments under the government buna-S synthetic-rubber program





Cross-section showing approximate location of break in WEP 24-in. line crossing Arkansas River near Little Rock which since has been bypassed with 8 miles of 20-in. laid across the Rock Island Railroad bridge

WEP Schedule Calls for 297,000 Bbl. Daily Next 3 Months

WASHINGTON, D. C. — Movement of 297,000 bbl. daily through the 24-in. crude-oil system of War Emergency Pipelines, Inc., is projected during June, July and August in Operating Schedule 5 issued here May 29. Starting in July, according to the tentative schedule, crude from Southwest Texas will displace a net of 30,000 bbl., from East Texas and the Gulf Coast in traffic through the WEP.

The sources of daily average shipments through the big-inch line are shown in Table 1.

TABLE 1—Origin of WEP Crude (Barrels daily)

Type crude—	June	July-Aug.
East Texas	185,000	174,000
West Texas	83,000	83,000
Gulf Coast	19,000	.....
Southwest Texas	10,000	40,000
Total	297,000	297,000

The WEP schedule of crude-oil traffic points out that no regular movement of heating oil is scheduled in June, July and August. The schedule, issued by J. R. Parten, PAW director of transportation, provides that "no petroleum or products shall be transported through the facilities of the WEP system except in pursuance of this schedule or amendments and supplements thereto."

About 32 per cent of the projected deliveries of crude are earmarked for delivery to the East Coast refineries of Standard Oil Co. of New Jersey at Everett, Mass., Bayway, N. J., and Baltimore, Md. Deliveries to Standard of New Jersey are scheduled at a level of 93,767 bbl. daily in June and

TABLE 3—Crude Oil Deliveries and Sales to War Emergency Pipelines, Inc., at Longview

Month of June

	Grade of crude oil				
Sellers—	East Texas	Gulf Coast	Southwest Texas	West Texas	Total
Atlantic Refining Co.	549,000	120,000	45,000	1,395,000	2,109,000
Central Pipe Line Co.	42,000	.....	.....	.....	42,000
Cities Service Oil Co.	390,000	.....	.....	45,000	435,000
Gulf Refining Co.	150,000	450,000	.....	300,000	900,000
Humble Oil & Refining Co.	1,368,000	.....	150,000	300,000	1,818,000
Magnolia Petroleum Co.	360,000	.....	60,000	.....	420,000
Pure Oil Co.	279,000	.....	.....	.....	279,000
Shell Oil Co., Inc.	510,000	.....	.....	.....	510,000
Sinclair Prairie Oil Marketing Co.	390,000	.....	.....	150,000	540,000
Sun Oil Co.	900,000	.....	45,000	.....	945,000
Texas Co.	.....	.....	.....	300,000	300,000
Tide Water Associated Oil Co.	612,000	.....	.....	.....	612,000
Total	5,550,000	570,000	300,000	2,490,000	8,910,000

Month of July

	Grade of crude oil			
Sellers—	East Texas	Southwest Texas	West Texas	Total
Atlantic Refining Co.	660,300	232,500	1,441,500	2,334,300
Central Pipe Line Co.	43,400	.....	.....	43,400
Cities Service Oil Co.	372,000	.....	46,500	418,500
Gulf Refining Co.	155,000	.....	310,000	465,000
Humble Oil & Refining Co.	1,382,600	604,500	310,000	2,297,100
Magnolia Petroleum Co.	341,000	232,500	.....	573,500
Pure Oil Co.	226,300	.....	.....	226,300
Republic Oil Refining Co.	.....	93,000	.....	93,000
Shell Oil Co.	434,000	.....	.....	434,000
Sinclair Prairie Oil Marketing Co.	372,000	.....	155,000	527,000
Sun Oil Co.	868,000	77,500	.....	945,500
Texas Co.	.....	.....	310,000	310,000
Tide Water Associated Oil Co.	539,400	.....	.....	539,400
Total	5,394,000	1,240,000	2,573,000	9,207,000

Month of August

	Grade of crude oil			
Sellers—	East Texas	Southwest Texas	West Texas	Total
Atlantic Refining Co.	660,300	232,500	1,441,500	2,334,300
Central Pipe Line Co.	43,400	.....	.....	43,400
Cities Service Oil Co.	372,000	.....	46,500	418,500
Gulf Refining Co.	155,000	.....	310,000	465,000
Humble Oil & Refining Co.	1,382,600	604,500	310,000	2,297,100
Magnolia Petroleum Co.	341,000	232,500	.....	573,500
Pure Oil Co.	226,300	.....	.....	226,300
Republic Oil Refining Co.	.....	93,000	.....	93,000
Shell Oil Co., Inc.	434,000	.....	.....	434,000
Sinclair Prairie Oil Marketing Co.	372,000	.....	155,000	527,000
Sun Oil Co.	868,000	77,500	.....	945,500
Texas Co.	.....	.....	310,000	310,000
Tide Water Associated Oil Co.	539,400	.....	.....	539,400
Total	5,394,000	1,240,000	2,573,000	9,207,000

TABLE 4—Crude Oil Deliveries and Sales by WEP at Illinois Terminals
(Figures in total barrels for month)

Month of June

Purchasers—	Grade of crude— East Texas	Gulf Coast and Southwest	West Texas	For delivery to	Destination
Atlantic Ref. Co.	631,500	103,500	1,200,000	Cars Norris City	Philadelphia, Pa.
Cities Service Oil Co.	195,000	.....	.....	Cars Benton	Braintree, Mass.
Cities Service Oil Co.	.....	.....	90,000	Cars Norris City	Linden, N. J.
Cities Service Oil Co.	261,690	.....	.....	Cars Benton	Petty Island
Cities Service Oil Co.	.....	45,300	.....	Cars Norris City	Petty Island
Gulf Oil Corp.	73,800	47,100	360,000	Cars Norris City	Philadelphia, Pa.
Sinclair Ref. Co.	957,800	92,400	.....	Cars Norris City	Marcus Hook, Pa.
Standard of N. J.	360,000	.....	.....	Cars Gale	Everett, Mass.
Standard of N. J.	.....	.....	240,000	Cars Norris City	Everett, Mass.
Standard of N. J.	510,000	.....	.....	Ohio Pipe Line	Bayway, N. J.
Standard of N. J.	630,510	259,500	450,000	Cars Norris City	Bayway, N. J.
Standard of N. J.	.....	.....	150,000	Cars Norris City	Baltimore, Md.
Standard of N. J.	213,900	.....	.....	Cars Benton	Baltimore, Md.
Soc.-Vac. Oil Co.	273,600	.....	.....	Cars Gale	Brooklyn, N. Y.
Soc.-Vac. Oil Co.	.....	28,400	.....	Cars Norris City	Brooklyn, N. Y.
Sun Oil Co.	732,300	.....	.....	Cars Bridgeport	Marcus Hook, Pa.
Sun Oil Co.	.....	77,700	.....	Cars Norris City	Marcus Hook, Pa.
Tide W. Assoc. Oil Co.	711,000	.....	.....	Cars Gale	Bayonne, N. J.
Tide W. Assoc. Oil Co.	.....	69,000	.....	Cars Norris City	Bayonne, N. J.
Total	5,550,000	810,000	2,490,000		

Months of July and August

Purchasers—	Grade of crude— East Texas	Southwest Texas	West Texas	For delivery to	Destination
Atlantic Ref. Co.	551,800	300,700	1,240,000	Cars Norris City	Philadelphia, Pa.
Cities Service Oil Co.	201,500	.....	.....	Cars Benton	Braintree, Mass.
Cities Service Oil Co.	.....	.....	93,000	Cars Norris City	Linden, N. J.
Cities Service Oil Co.	236,840	.....	.....	Cars Benton	Petty Island
Cities Service Oil Co.	.....	80,290	.....	Cars Norris City	Petty Island
Gulf Oil Corp.	510,570	140,430	372,000	Cars Norris City	Philadelphia, Pa.
Sinclair Ref. Co.	947,670	137,330	.....	Cars Norris City	Marcus Hook, Pa.
Standard of N. J.	372,000	.....	.....	Cars Gale	Everett, Mass.
Standard of N. J.	.....	.....	248,000	Cars Norris City	Everett, Mass.
Standard of N. J.	527,000	.....	.....	Ohio Pipe Line	Bayway, N. J.
Standard of N. J.	525,760	393,080	465,000	Cars Norris City	Bayway, N. J.
Standard of N. J.	.....	.....	155,000	Cars Norris City	Baltimore, Md.
Standard of N. J.	221,030	.....	.....	Cars Benton	Baltimore, Md.
Soc.-Vac. Oil Co.	270,940	.....	.....	Cars Gale	Brooklyn, N. Y.
Soc.-Vac. Oil Co.	.....	39,060	.....	Cars Norris City	Brooklyn, N. Y.
Sun Oil Co.	324,880	.....	.....	Cars Bridgeport	Marcus Hook, Pa.
Sun Oil Co.	.....	47,120	.....	Cars Norris City	Marcus Hook, Pa.
Tide W. Assoc Oil Co.	704,010	.....	.....	Cars Gale	Bayonne, N. J.
Tide W. Assoc. Oil Co.	.....	101,990	.....	Cars Norris City	Bayonne, N. J.
Total	5,394,000	1,240,000	2,573,000		

93,770 bbl. in July and August.

Atlantic Refining Co. is scheduled to receive 67,500 bbl. daily of WEP crude during the 3-month period. Deliveries to Sun Oil Co. at Marcus Hook, Pa., scheduled at 27,000 bbl. daily in June, are to be cut to 12,000 bbl. during July and August. Gulf Oil Corp., on the other hand, will increase its receipts of WEP crude from 16,000 bbl. daily in June to 33,000 bbl. in July and August.

TABLE 2—Daily Average Delivery Schedules of WEP Crude by Companies

Company—	June	July-Aug.
Standard of N. J.	93,767	93,770
Atlantic	67,500	67,500
Sinclair	35,000	35,000
Sun	27,000	12,000
Tide Water	28,000	28,000
Cities Service	19,733	19,730
Gulf	16,000	33,000
Socony-Vacuum	10,000	10,000
Total	297,000	297,000

The PAW schedule, designating finally for June, and tentatively for July and August, shows:

1. By whom and in what quantities crude oil and heating oil shall be delivered to Longview and sold to War Emergency Pipelines, Inc., as agent for Defense Supplies Corp.

2. By whom and in what quantities the crude oil and heating oil to be delivered at the easterly terminals of the pipe-line system during each such month shall be purchased and received.

3. The refineries and terminals in District 1 to which such crude oil and heating oil shall be supplied.

In appraising the effect of WEP scheduled movement on the producing and transportation branches of the industry, it should be remembered that unforeseeable conditions cause frequent revisions in the projected figures. However, the schedule provides a pattern of operations for the next 3 months and establishes the objectives at which PAW and WEP are aiming.

Humble Adopts Longer Work Week at Houston

HOUSTON, Tex.—Loss of personnel to war service and increased work resulting from its part in the war effort have impelled Humble Oil & Refining Co. to adopt a 48-hour week for the Houston office, effective June 1, it was announced last week by Harry C. Wiess, president. The extended work week has been in effect several months in various field and refinery operations, and inclusion of the big Houston headquarters places 13,000 men and women under its provisions.

Employes subject to the provision of the wage-hour act will receive additional compensation at the rate of time and one-half for hours worked beyond 40 hours a week, or an increase of 30 per cent in wages for 20 per cent increase in time.

"In accordance with the formula approved by the salary stabilization unit of the U. S. Treasury Department, salaried employes not subject to the wage-hour act will receive an increase in earnings of 30 per cent on salaries up to $300 a month," Mr. Wiess' announcement said. "On salaries ranging from $300 to $450 an increase of $90 will be paid. On salaries between $450 and $650 per month there will be a 20 per cent increase."

Talco and Sulphur Bluff Crude Ceiling Increased

WASHINGTON, D. C.—Maximum prices of crude petroleum produced in two Texas fields were revised upward by the Office of Price Administration, effective May 28.

The ceilings at the receiving tank for crude petroleum produced in the Talco and Sulphur Bluff fields in Franklin, Titus and Hopkins counties, Texas, are established at from 80 cents to 92 cents per barrel, depending on gravity. This compares with a uniform maximum price of 79 cents for all gravities previously. As the average gravity produced is about 21°, the average increase in the ceilings is 5 cents per barrel.

The increases adjust prices in these two fields to ceilings of comparable crudes in the same general area. They need not result in an increase in the maximum prices of refiners who purchase petroleum and thus they will have no effect on the cost of living, OPA said.

Trans-Florida Line to Be Operated by Pure and Gulf

WASHINGTON, D. C. — Defense Plant Corp. has terminated its contract with the Trans-Florida Pipe Line Co. of Atlanta, Ga., to complete construction and operate the line through a subsidiary, Florida Emergency Pipe Line Co.

DSC has negotiated a new agreement with Southeastern Pipe Line Co., owned jointly by Gulf Refining Co., and Pure Oil Co., covering supplies for and operation of the Trans-Florida system. Southeastern, it is understood, will form a new corporation to be known as the Florida Emergency Pipe Line Co., to operate the line for DSC, which in turn leases it from Defense Plant Corp.

Information Clinic Shows How Industry May Acquire and Use Supplies Under P-98-b

by H. Stanley Norman

AN information clinic in Tulsa May 29 on how the petroleum industry will operate under Preference Rating Order P-98-b, amended, proved to the apparent satisfaction of Mid-Continent operators and supply men that the procedure for obtaining equipment has been substantially simplified. The new order, according to explanations from representatives of the Petroleum Administration for War who visited the Mid-Continent to clarify the order as much as possible for oil and supply company representatives, covers about 98 per cent of the industry's equipment requirements.

For all practical purposes, the PAW speakers declared, oil men can forget the other preference orders. Furthermore, those operators engaged exclusively in one branch of the industry can ignore portions of the new P-98-b which do not apply to their particular interests.

Official Answers Prepared

H. R. Hansen, Washington, D. C., on the staff of the PAW Division of Materials and L. B. Holland, Chicago, director of materials for PAW District 2, conducted the Tulsa information clinic and answered all questions frankly. Both speakers, however, pointed out that official interpretations are being issued by the PAW legal division as rapidly as possible. They said that questions submitted at Tulsa would be given official replies as soon as the list could be submitted to the legal department, probably within 10 days or 2 weeks.

The order which probably has bothered the oil industry more than any is L-41, Mr. Hansen declared, and this regulation, covering new construction, has been replaced entirely by provisions of P-98-b. Parts or all of CMP 1, 2 and 5 have been superseded by specific provisions of the new oil industry materials order.

Messrs. Holland and Hansen explained that P-98-b had been simplified as much as possible, particularly for small companies and independents, by requiring only one basic form, PD-873, which covers practically all conceivable requirements.

Sections of P-98-b covering maintenance, repair and operating supplies should be used, the two PAW materials men advised, only if material being replaced is unfit for further service. They said, however, that under this interpretation, MRO sections of the order could apply to drill pipe, wire lines, drilling bits and other such equipment. In other words, they explained, MRO materials are not necessarily confined to production equipment.

Several operators inquired about the status of new lease houses and were advised that such construction is a producing operation covered by P-98-b. Some operators said they had experienced difficulty in obtaining materials for lease houses but were assured by Mr. Hansen that an official ruling has classified such construction as a production operation, and that P-98-b should be used.

Operators were advised to promptly file Form PD-873, covering all materials needed for the second and third quarters, excluding, however, controlled materials on which allotment symbols have been issued.

Mr. Hansen said that it was perfectly proper for oil operators to use other than petroleum industry orders to obtain office equipment and machines, making applications on PD-1A.

One question which went unanswered pending a ruling from Washington was whether an operator could purchase and a supplier could sell tubular goods from inventory on regular preference ratings. At first, Mr. Hansen thought this could not be done legally because tubular goods are covered by the CMP, meaning that all such materials available to the industry are currently covered by allotments already issued. Sales of tubular goods without regard to CMP, Mr. Hansen thought, would mean that some operator holding an allotment "check" would be unable to cash it because the pipe against which the draft was issued would have been diverted. Later, when it was pointed out that the steel-warehouse order permits delivery of tubular goods against preference ratings until July 1, Mr. Hansen said it would have to be determined whether PAW, under such circumstances, had the authority to issue preference ratings without regard for CMP allotments.

Official answers to several questions on application of P-98-b have been issued by PAW. Questions on producing, manufacturing and transportation operations asked at a District 2 information clinic in Chicago May 28 and the official replies are published on next page.

Gathering Considered Production

Laying of gathering lines, PAW representatives pointed out, is now classified as a producing operation regardless of who constructs the facility. Gathering lines, they explained, mean any line from the discharge valve of lease or production tanks to trunk lines or bulk delivery points. If the cost of a gathering line is under $2,500, application for materials is made on Form PD-873. If the cost of materials exceeds $2,500, construction of gathering lines must be covered by an exception to PAO 11.

The hope that supply companies and pipe mills can agree on location of the 14 emergency equipment depots to be established at strategic points throughout the country was expressed by Mr. Hansen. He said that PAW does not wish to make a decision on location of the depots and fervently hopes that if a Washington agency is forced to make the designations, the duty will be assigned WPB.

Mr. Hansen was asked if the sizes of tubular goods available at the emergency depots will be published so that wildcat operations can be geared to the supplies. He said that the suggestion was excellent and that it would be given prompt consideration at Washington. Field and mill emergency stocks of tubular goods will be under the jurisdiction of PAW district offices.

The value of equipment used by the industry under provisions of P-98-b and other limitation orders applies to all supplies utilized whether new or second hand, it was repeated several times during the Tulsa meeting.

PAW Answers on P-98-b

These official answers to questions of operators on P-98-b were issued last week by PAW, following the first District 2 information clinic held in Chicago May 28. For account of Tulsa meeting May 29, see page 19.

Why is it essential that an operator who does not require any or all of an allotment of controlled materials given to him, shall notify PAW to this effect?

The PAW is allotted a limited quantity of controlled materials for reallotment to the petroleum industry. Since the quantity available to PAW is smaller than that necessary, most operators will be granted less than they could effectively use. When any operator will not use his entire allotment, he should notify the PAW, so that the PAW may make it available to another operator who needs it. If the PAW is not so notified, the petroleum industry will be deprived of the use of the valuable materials.

How may an operator become a participant in the PAW Materials Redistribution Program 2?

If the PAW Materials Redistribution Program 2 is issued and in effect prior to June 1, 1943, the program will itself contain all necessary instructions. If it is not in effect by June 1, orders P-98-b and P-98-c will be amended to indicate a later date on which such participation becomes mandatory.

Schedule A, paragraph (1) (ii) provides that the MRO procedure may be used for the restoration of material or equipment that is unsafe or unfit for service. May this procedure be used to obtain drill pipe, wire drilling lines or casing lines, etc.?

Such material should be replaced by means of the MRO procedure only if the material being replaced is unfit for further service within the limitations of the definitions.

A production operator in drilling an oil or gas well has all of the necessary capital equipment on hand to complete such well, with the exception of a small amount of capital equipment costing less than $500. This might be a rotary tong of a size and type which he did not formerly possess, or a small quantity of casing. May he obtain such additional capital equipment under the MRO provisions of the order?

The MRO provisions do not apply in this case. They grant assistance to obtain capital additions in complete operations not exceeding $500 in total material cost. The drilling of the well is the complete operation, and the material cost of such complete operation is far in excess of $500.

Schedule A, paragraph (1) (iii) provides that "maintenance or repairs shall not include the installation or replacement of pumping or other artificial lifting equipment." Is this intended to prevent the operator from using the MRO provisions of the order for replacing certain component units or parts of such pumping or other artificial lifting equipment such as an engine or electric motor, a pumping unit, a string of sucker rods or deep-well pump, when such component units or parts "have been rendered unsafe or unfit for service by wear and tear, damage, destruction, failure of parts or similar causes"?

The above provision in Schedule A, paragraph (1) (iii) is intended to prevent the installation or replacement of an entire pumping or artificial lifting assembly (but not the parts or subassemblies thereof) composed of component parts, such as a motor, pumping unit, sucker rods and deep-well pump, used in combination for pumping or artificial lifting purposes in production. It does not prevent legitimate repairs to parts or subassemblies when the installation or replacement of the entire assembly is not involved.

Does Schedule B, paragraph (c) deny the assistance of order P-98-b to the building of a lease house by a production operator?

The building of a lease house is considered a "production operation" and the material is obtainable through P-98-b. The restriction contained in the above-referred-to paragraph applies to material or equipment which is to be used for "residential construction" in connection with "construction operation" and this latter term applies only to natural-gasoline production, transportation, refining and marketing.

Is it necessary for an operator to give the approved copy of a delivery order to his supplier?

The approved copy should be retained in the operator's file. The certification which the operator places on the original copy of his delivery order and presents to his supplier, is a certification to the effect that all necessary approval has been obtained.

Is it important that an operator endorse upon his delivery order or accompany such delivery order with a statement identifying the specific use to which the material is to be put, the branch of the petroleum industry and the PAW district in which the material is to be used, the price, quantity and description of the material (including weight if a controlled material) and where applicable, such additional information as may be necessary to enable PAW to make an accurate determination of the operator's needs?

It is very important that all such requested information be given in full. Every item of information requested is required for a specific purpose and failure to give such information will necessarily result in delay in processing the application.

Part 2 of Schedule D lists "industrial control instruments" as being among the specified MRO materials requiring approval. How inclusive is the term "industrial control instruments"?

The term "industrial control instruments" includes all indicating instruments such as gages, thermometers, etc.; all recording instruments such as recording gages, potentiometers, etc.; and all control instruments such as flow controllers, liquid-level controllers, etc.

In Schedule E under "Refining or Transportation," operations (a) and (b) contain a reference to a construction operation that can be completed "primarily with material on hand." What is meant by the phrase "which can be completed primarily with material on hand"?

It was considered advisable to permit operators who had sufficient material available ("material on hand" as defined in Schedule E) to undertake construction operations costing less than $3,000 without obtaining authority. Material already acquired through the MRO procedure is not considered to be "material on hand," but since it appeared impracticable to hold up an operation for which all material was on hand except a small quantity in stock as MRO material, operators may in such a situation use a limited amount of MRO material.

If priorities assistance is needed to obtain material other than that which is "primarily on hand," how must such assistance be obtained? (This question applies to a construction operation with an estimated cost of less than $3,000 for any one complete operation.)

Operation (a) under "Refining or Transportation" was included to authorize construction of under $3,000, for which priorities assistance (other than the limited types permitted by the definition of "material on hand") would not be required. If priorities assistance is required, the procedure of operation (c) is applicable (regardless of the total cost of the operation) and Form PD-200 must be used.

FOUNDED IN 1910

BY PATRICK C. BOYLE

the OIL AND GAS JOURNAL

Coming Home to Roost

WASHINGTON, D. C.—In this war center where the Allied strategy for coming months is now being worked out, one frequently hears that the "chickens are coming home to roost"—not relative to agriculture, which with its farm blocs is able to take care of itself, but in regard to practically everything else. The expression is particularly apt when applied to the present status of petroleum.

Things are happening which are solely a reflection of the Government's policy of placing oil administration with one agency and all the basic controls of this industry with other war units.

Gasoline supplies for civilians are short and unless something is done quickly to bring about the required balance in output and demand, other sections of the United States are going to have a taste of the drastic restrictions in motor-fuel use in effect in the East and Southeast for too many weeks.

Without consulting anyone, OPA set up the gasoline rationing program which is now falling apart. The faults in application, including the manner of issuing coupons and classifying users, were obvious from the start.

There never was any serious attempt made by the price administration to find out what the gasoline supplies this year would be, taking into consideration the known transportation conditions.

PAW and the oil industry have been in a position of having a bank account, with someone else, having no accurate knowledge of what was on deposit, writing the checks. The situation in regard to civilian oil supplies has been aggravated because military officials also have had too little knowledge of what the Army and Navy required in petroleum.

This same OPA not only writes the checks but also determines the prices to be paid for the petroleum which in effect it has been withdrawing from disappearing stocks. It has turned a deaf ear when the need for general advances has been shown.

This price situation is also a factor in the present crude-oil supplies and its importance will increase from month to month. As those in government service and within the industry who are closest to the problem, survey the supply prospects for the last half of this year and next year, they realize the alarming conditions brought by the shortsighted price policy of the Government since the war began.

Shortages are already here and with increased demands centering in the military and the essential civilian requirements, conditions can become acute before the year ends. This problem did not come overnight and likewise there is no quick solution. New oil reserves have been falling behind current demands for a considerable period and this situation will not begin to be reversed until all the operating forces of the petroleum industry, backed with the support of a fair price, are put to work again.

There is agreement here that a liquidation or a substantial reorganization of OPA with a probable distribution of its activities to other agencies, is in the offing. The rationing of oil products should rest with the governmental agency which directs the production of raw materials and the manufacturing and transportation operations. Equally apparent is the fact that the price around which all these operations evolve should center in the same agency.

The petroleum industry needs to be alert to the opportunities at this time to obtain those powers in distribution and markets which should have been with its war agency from the start.

Directive 67 Establishes Rule Over District 3 Distribution

Here is the complete text of Directive 67, establishing control over distribution of gasoline in and from PAW District 3.

THE shortage of facilities for the transportation of petroleum has created in certain areas shortages in the supply of petroleum for defense, for private account, and for export, and has made it imperative that all such facilities be used with maximum efficiency, that all unnecessary back hauling, cross hauling, and other movement of petroleum be eliminated; and the following operating directive is deemed necessary for the prosecution of the war.

(a) Definitions.

1. "Person" means any individual, partnership, association, business trust, corporation, governmental corporation or agency, or any organized group of persons whether incorporated or not.

2. "Original supplier" means any person who at the date of the issuance of this directive refines petroleum or operates a rcycling plant in the United States and sells petroleum products for delivery in District 3, or who distributes petroleum products through a terminal in District 3.

3. "Petroleum products' means motor fuel, kerosene, range oil, tractor fuel, distillate fuel oils, and residual fuel oils.

4. "District 3" means the states of Alabama, Mississippi, Louisiana, Arkansas, Texas, and New Mexico.

5. "Refinery marketing area" means those areas within District 3 numbered 1 to 11, as described in Exhibit A hereof.

6. "Neutral area" means those counties listed in Exhibit B hereof, which shall be considered to be a part not only of the refinery marketing area in which they are specifically included in Exhibit A but also a part of each refinery marketing area to which they are contiguous.

7. "Terminal" means any storage plant supplied with petroleum products by pipe line or river barge, as distinguished from bulk distributing stations or refineries.

(b) Surveys and Investigations.

Subject to the supervision of the director of petroleum supply, or such district director as he may designate, the general committee for District 3 shall obtain, analyze, and keep current such pertinent and available facts, figures, and other data with respect to the available supplies of petroleum products and transportation facilities in, to, and from District 3 as may be necessary or appropriate in connection with the performance of the functions and duties with which the general committee for District 3 is charged hereunder: Provided, that whenever available such facts, figures, and other data shall be obtained from other appropriate committees or subcommittees rather than by new surveys or investigations.

(c) District 3 Petroleum Supply Operations.

Subject to the supervision of the director of petroleum supply, or such district director as he may designate, the general committee for District 3 shall arrange for purchases, sales, exchanges, and loans of motor fuel among original suppliers in District 3 when any such transaction will:

1. Eliminate or shorten the movement of motor fuel by pipe line, barge, or tank-car facilities within the confines of District 3: Provided, that such transaction does not result in a wasteful use of any such transportation facility within or outside of District 3; or

2. Eliminate a movement or movements of motor fuel from District 2 to District 3, except:

(i) To the counties of Benton, Carroll, Boone, Washington, Madison, Newton, Crawford, Sebastian, and Franklin of the State of Arkansas; and

(ii) Tank-truck deliveries from river terminals in the immediate vicinity of Memphis, Tenn., in Areas 9 and 10; or

3. Result in a substitution of a pipe-line movement or movements of motor fuel for a movement or movements by barge, tank car, or transport truck; or

4. Eliminate cross hauling or back hauling of motor fuels.

Provided, that no such transaction shall be arranged that results in any movement of motor fuel for distribution or consumption from one refinery marketing area into another such area except eastward or northward movements between Areas 11, 4, 7, and 10.

(d) Elimination of Unnecessary Movements Within District 3.

For the primary purpose of furthering the war effort by conserving transportation facilities for movement of motor fuel in a northerly and easterly direction, and in order (by so doing) to maintain for local consumers an adequate supply thereof, the general committee for District 3 shall, subject to the supervision of the director of petroleum supply, or such district director as he may designate, arrange for exchanges, loans, sales, and purchases of motor fuel between and among original suppliers in District 3 which will eliminate to the maximum extent the movement of motor fuel between the refinery marketing areas described in Exhibit A hereof. Original suppliers in District 3 shall eliminate interarea shipments between such areas and shall obtain necessary supplies and dispose of surpluses of motor fuels by means of exchanges, loans, sales, and purchases as provided in the foregoing sentence: Provided, that nothing herein contained shall be deemed to prohibit the movement of motor fuel from Areas 4, 7, 10, or 11 to any point outside of District 3 or any eastward or northward movement of motor fuel between Areas 4 7, 10, or 11, and, Provided further, that nothing contained herein shall be deemed to prohibit the shipment from any refinery marketing area described in Exhibit A hereof to a depth of 10 miles in any areas adjacent thereto or the shipment from any such area into a contiguous neutral area.

(e) Extension of Applicability of Directive to Other Petroleum Products and Changes of Area Boundaries.

The provisions of this directive may be extended, in whole or in part to any other petroleum product contained in the definition of petroleum products in paragraph (a) hereof, and the boundaries of the several areas described in Exhibits A and B hereof may be changed by the director of petroleum supply whenever he finds that such action will conserve transportation facilities, alleviate a shortage of a petroleum product or products, or in any other manner further the objectives of this directive. Such an extension of this directive may be made applicable to any one or more or to all of the areas defined in Exhibits A and B hereof.

(f) Sales, Loans, and Exchanges.

1. The terms and conditions of any exchange, loan, sale, or purchase made pursuant to this directive shall be subject to negotiation between the parties to any such transaction: Provided, that no price agreed upon shall exceed any applicable ceiling price established by the Office of Price Administration, and, Provided further, that if the parties to any such transaction are unable to agree upon the price or other terms and conditions for furnishing any of the petroleum required to be sold, exchanged, or loaned under this directive, or for the use of any facilities, any such dispute shall be referred to the director of petroleum supply, or such district director as he may designate, for such action as he may direct.

2. All exchanges, loans, sales, and purchases pursuant to this directive shall be effected, in so far as practicable, in such a manner as to provide to customers, including intermediate suppliers, of original suppliers in each of the areas an equitable share of the supplies of motor fuel available in each such area.

(g) Determination of Requirements.

The general committee of District 3, in collaboration with the refining committee for District 3, shall analyze and determine the amounts of motor fuel available to Areas 1, 2, 3, 5, 6, 8, and 9. The general committee shall make recommendations to the director of refining with respect to the amounts of motor fuel necessary to meet the needs of each such area.

(h) Movement of Surpluses to Other Districts.

The general committee for District 3 shall advise the transportation committee of District 3 of, and the transportation committee shall arrange with the appropriate committees for other districts and with the Petroleum Administration for War for transportation facilities to move to such other districts, such surpluses of petroleum products as may be created in any area of District 3 by the operation of this directive. Such arrangements shall be in accordance with the provisions of Petroleum Directive 59, as amended, or as hereafter amended, and, as respects shipments to District 2, in accordance with the provisions of Petroleum Directive 65.

(i) Authority of General Committee to Delegate the Duties and Responsibilities Subject to Its Authority and Control.

The general committee for District 3 may delegate to any committee or subcommittee established under the authority of the Petroleum Administration for War the performance, in whole or in part, of the functions and duties vested in it by this directive, subject to the control and direction of the general committee for District 3.

(j) Administration.

In carrying out the duties, responsibilities, and functions imposed upon it by this directive, the general committee for District 3 shall consult with appropriate committees to the extent that activities hereunder may affect such commitees and subcommittees. Meetings of the general committee for District 3 and other committees, subcommittees, and persons who may be affected by this directive may be held from time to time for the purpose of doing all things necessary to carry into effect the provisions of this directive. The general committee shall maintain such staff and appoint such persons as it finds necessary to carry out its responsibility, duties, and functions under this directive. Operating expenses of the committee shall be met as provided in Section 1500.7 of this chapter.

(k) Appeals.

Any person affected by this directive or any action taken hereunder who considers

that compliance therewith would work an exceptional and unreasonable hardship upon him may appeal to the district director in charge of the Office of Petroleum Administration for War for District 3, 247 Mellie Esperson Building, Houston, Tex., setting forth the pertinent facts and reasons why he considers himself entitled to relief, which director shall act promptly upon such appeal and render a decision thereon within a period of 15 days. If dissatisfied with the decision of the district director in charge, such person may appeal within 15 days after receipt of notice of the district director's decision to the deputy petroleum administrator, or such representative as he may designate.

(i) Revocation of Conflicting Provisions of Plan 16 as Revised.

To the extent of such conflict only, all provisions of Plan 16, revised, entitled a "Plan for the Appointment of a Supplies and Distribution Subcommittee for District 3 and for Increasing the Movement of Petroleum and Petroleum Products From District 3 to District 1 and for Increasing the Efficient Use of Facilities in District 3" which are in conflict with the provisions of this directive are hereby revoked.

Issued this 22nd day of May 1943.

RALPH K. DAVIES,
Deputy petroleum administrator for war.

EXHIBIT "A"

Refinery Marketing Areas

Area 1.—The counties of McKinley, Sandoval, Santa Fe, Bernalillo, Valencia, Catron, Socorro, Lincoln, De Baca, Chaves, Lea, Eddy, Otero, Dona Ana, Luna, Sierra, Grant and Hidalgo of the State of New Mexico; the counties of El Paso, Hudspeth, Culbertson, Reeves, Pecos, Terrell, Brewster, Presidio, and Jeff Davis, Texas.

Area 2.—San Juan, Rio Arriba, Taos, Colfax, Union, Torrance, Harding, Mora, San Miguel, Guadalupe, Quay, Curry, and Roosevelt of the State of New Mexico; the counties of Dallam, Sherman, Hansford, Ochiltree, Lipscomb, Hartley, Moore, Hutchinson, Roberts, Hemphill, Oldham, Potter, Carson, Gray, Wheeler, Deaf Smith, Randall, Armstrong, Donley, Collingsworth, Parmer, Castro, Swisher, Briscoe, Bailey, Lamb, Hale, Floyd, Cochran, Hockley, and Lubbock, Texas.

Area 3.—Yoakum, Terry, Lynn, Garza, Kent, Stonewall, Gaines, Dawson, Borden, Scurry, Fisher, Jones, Shackelford, Stephens, Palo Pinto, Andrews, Martin, Howard, Mitchell, Nolan, Taylor, Callahan, Eastland, Erath, Loving, Winkler, Ector, Midland, Glasscock, Sterling, Coke, Runnels, Coleman, Brown, Comanche, Ward, Crane, Upton, Reagan, Irion, Tom Green, Concho, McCulloch, Mills, San Saba, Crockett, Schleicher, Menard, Mason, Sutton, Kimble, Valverde, and Edwards counties, Texas.

Area 4.—Llano, Burnet, Williamson, Gillespie, Blanco, Travis, Bastrop, Hays, Caldwell, Kerr, Real, Bandera, Kendall, Comal, Guadalupe, Kinney, Uvalde, Medina, Bexar, Wilson, Gonzales, Maverick, Zavala, Frio, Atascosa, Karnes, De Witt, Lavaca, Dimmit, La Salle, McMullen, Live Oak, Bee, Goliad, Victoria, Jackson, Calhoun, Refugio, Aransas, San Patricio, Nueces, Kleberg, Jim Wells, Duval, and Webb counties, Texas.

Area 5.—Hall, Childress, Motley, Cottle, Crosby, Dickens, King, Hardeman, Foard, Knox, Haskell, Wilbarger, Baylor, Throckmorton, Wichita, Archer, Young, Clay, Jack, Montague, Wise, Cooke, and Grayson counties, Texas.

Area 6.—Fannin, Lamar, Red River, Delta, Denton, Collin, Hunt, Parker, Tarrant, Dallas, Rockwall, Kaufman, Van Zandt, Hood, Somervell, Johnson, Ellis, Bosque, Hill, Navarro, Henderson, Hamilton, Lampasas, Coryell, McLennan, Limestone, Freestone, and Anderson counties, Texas.

Area 7.—Bell, Falls, Milam, Robertson, Leon, Houston, Madison, Brazos, Burleson, Lee, Washington, Waller, Grimes, Montgomery, Walker, Trinity, San Jacinto, Polk, Angelina, San Augustine, Sabine, Newton, Jasper, Tyler, Hardin, Orange, Jefferson, Liberty, Chambers, Galveston, Harris, Brazoria, Fort Bend, Wharton, Austin, Colorado, Fayette, and Matagorda counties, Texas; the parishes of Vernon, Beauregard, Allen, Evangeline, Acadia, Jefferson Davis, Calcasieu, Cameron, and Vermilion, Louisiana.

Area 8.—Hopkins, Franklin, Titus, Morris, Camp, Rains, Wood, Upshur, Marion, Harrison, Panola, Gregg, Rusk, Nacogdoches, Cherokee, and Smith counties, Texas.

Area 9.—All of Arkansas except the counties of Benton, Carroll, Boone, Washington, Madison, Newton, Crawford, Franklin, and Sebastian; the parishes of Caddo, Bossier, Webster, Claiborne, Union, Morehouse, West Carroll, East Carroll, Lincoln, Bienville, Jackson, Ouachita, Richland, Madison, De Soto, Red River, Winn, Caldwell, Franklin, Tensas, Sabine, Natchitoches, Grant, La Salle, Catahoula, and Concordia, Louisiana; the counties of Bowie, Cass, and Shelby of the State of Texas.

Area 10.—All of Mississippi; all of Alabama; the parishes of Rapides, Avoyelles, Pointe Coupe, St. Landry, Lafayette, St. Martin, Iberville, West Baton Rouge, East Baton Rouge, West Feliciana, East Feliciana, St. Helena, Livingston, Tangipahoa, Washington, St. Tammany, Orleans, St. Bernard, Plaquemines, Jefferson, La Fourche, Terrebonne, St. Charles, St. John the Baptist, St. James, Ascension, Assumption, St. Mary, and Iberia, Louisiana.

Area 11.—Zapata, Jim Hogg, Brooks, Kenedy, Starr, Hidalgo, Willacy, and Cameron counties, Texas.

EXHIBIT "B"

Neutral Areas

1. The counties of Santa Fe and Torrance, New Mexico.
2. The counties of Grayson, Bowie, Cass, and Nacogdoches, Texas.
3. The parishes of Vernon, Rapides, Avoyelles, Concordia, Tensas, Madison, East Carroll, and West Carroll, Louisiana.

Federal Order Digest

PAW Regulations

Distribution—Directive 67: Imposes complete regimentation and control over distribution of motor fuel in and from District 3, effective June 1.

Well Spacing—PAO 11, SO 9: Establishes exceptions under which development operations may proceed in the Dorcheat-Macedonia field, Columbia County, Arkansas, issued May 22.

Supplies — Administrative order: Stipulates that dealers in the shortage area must grant preferred status to nonhighway-farm requirements for motor fuel, issued May 22.

WPB-CMP Orders

Forms — CMPL-150A, 200A and 201A: Suggested for use by contractors (consumers of controlled materials) in extending allotments of controlled materials to their subcontractors, or for increasing or decreasing allotments to subcontractors, issued May 20.

Production — CMPR 8, amended: Provides that, in some instances, where controlled-material producer requires the same basic material as that which he produces to fabricate another form of controlled material, such may be made available through allotment procedure rather than by directive, issued May 25.

WPB Limitation Orders

Pressure Gages—LO L-272, revised: Adds Schedules 4 and 5, regulating sizes and types to eliminate frills and specifies materials to be used for inner valves, seat rings and bolting material. Expected to raise production 15 to 25 per cent, effective May 29.

Alkanolamines—AO M-275, amended: Places diethylethanolamine under allocation control and removes triethanolamine; alkanolamines are defined as: monoethanolamine, diethanolamine and diethylethanolamine, issued May 25.

Butyl Alcohol—GPO M-159, amended: Includes the acetic esters of butyl alcohol in the scope of allocation control, issued May 26.

Wire Stitching—LO L-291: Limits the use of wire stitching or stapling for the binding of certain printed matter, to peg the consumption at a level of not over 70 per cent of normal amount used annually, issued May 25.

Organization — Distribution Bureau of WPB now fully organized in five units: (1) Office of the Director; (2) Controller Division; (3) Canadian Division; (4) Priorities Control Division; and (5) Compliance Division.

Steel Drums — Interpretation of Form PD-835: Explains that users of shipping drums must have preference rating assigned before using this form. Qualification under CMP or PRP, using Forms PD-25f, CMP-4-b, or PD 1-a is prerequisite to filing Form PD-835, issued May 29.

OPA Price Orders

Crude Oil—RPS 88, Amendment 107: Lifts ceiling an average of 5 cents per barrel on oil produced at Talco and Sulphur Bluff fields, Franklin, Titus and Hopkins counties, Texas, effective May 28.

Antifreeze—MPR 170, Amendment 4: Reduces ceiling prices on Type S antifreezes to reflect reductions recently ordered for synthetic ethyl alcohol, effective May 22.

Transportation Orders

Conservation of Motor Equipment—ODT 39: Calls for reduction of 20 per cent in mileage by bus and taxicab operators in northeastern gasoline shortage area, by stretching out T coupons, effective May 27.

Lend-Lease Oil Shipments Next 18 Months Valued at Approximately $752,000,000

WASHINGTON, D. C.—The Office of Lend-Lease Administration expects to spend $752,000,000 for petroleum products to be exported to Allied and associated nations during the 14 months from April 30, 1943, through June 30, 1944, according to estimates submitted to the House committee on appropriations.

Very few details regarding lend-lease activities were released by the committee, and the transcript of its executive sessions were heavily censored to avoid revealing military information. However, in estimating the amount of shipping required during this 14-month period, the Lend-Lease Administration stated that petroleum products would require 22,100,000 ship tons or 17,800,000 long tons.

In reporting the appropriation bill the committee said:

"The advance of the Nazi Army into the Caucasus oil regions greatly increased the Russian need for petroleum products in the second half of 1942. Soviet shipping priorities on gasoline and lubricants climbed steadily. We are still sending substantial quantities of gasoline and oil, but now that the Soviet armies have retaken many of their most important oil fields, we are rushing oil-well equipment to them also, so that they can restore petroleum production in these areas."

In testifying on the petroleum part of lend-lease activities, James Terry Duce, director of the Foreign Division of the Petroleum Administration for War, was asked if conquest of the Mediterranean would materially change the shipping situation for petroleum. He replied:

"It will not at first. The reason is that the refineries in the eastern Mediterranean—Haifa and at Suez, and in the Persian Gulf—are running to capacity now, and it is probable that we will have to install additional refining capacity in the Persian Gulf a little later on, in view of the requirements we will probably have in the Far East."

Other fragments of testimony which the committee permitted to be published revealed that petroleum storage facilities in Great Britain are adequate at the present time, and that bombing has not proved exceptionally destructive. An estimate of $7,430,000 was included for export of Ethyl fluid to be mixed with 67-octane gasoline at some undisclosed point. There is another item of $41,000,000 for miscellaneous petroleum products such as wax, asphalt, and various additives.

Mr. Duce explained that a large part of the petroleum products exported under lend-lease are used by American fighting forces in England, Australia, and other points on reciprocal lend-lease. Asked if the total number of barrels of petroleum products scheduled for lend-lease shipment can be supplied in addition to the foreseeable demands of our own Army and Navy and still leave enough for minimum domestic needs, Mr. Duce replied that we may not be able to supply the entire lend-lease requests if the armed forces divert tankers for their own operations.

Because the testimony was so heavily censored, some of what was approved for publication is not very clear, but it would appear from a published interchange between Mr. Duce and Rep. John Taber of New York that Lend-Lease is figuring on exporting approximately 140,000,000 bbl. of something, whether all petroleum products or just one is not stated, during the fiscal year from July 1943 to June 1944, of which 114,000,000 bbl. will come from the United States and 25,000,000 bbl. from refineries owned by American companies in Venezuela and other areas abroad.

Inspection Confirms Size Of Gulf Coast Plants

(Continued from Page 16)

this point, but that also we have proved the practicability of large-scale commercial production of this vital synthetic rubber raw material from oil by two of the principal processes to be employed in the government program. This was made possible by intensive research and the commercial application of a tremendous store of chemical engineering knowledge accumulated during the years before the war."

The company said that its first butadiene plant at Baton Rouge was started many months before Pearl Harbor. This was the first full-size oil-cracking plant designed to produce butadiene.

"Early this year our second plant was placed in operation," the company added. "Originally this plant, using the same process as the first, was planned to supply raw materials for our own specialty rubbers; but the Government bought its output and we have been shipping butadiene to various government synthetic rubber plants ever since it started operation.

"The third plant was the first of the nation's so-called 'quickie' units. Such units consist of oil refinery equipment converted to make butadiene without the normal delay incident to new construction. It was opened in March of this year.

"This was followed in April by the opening of a fourth plant which piloted the main government program for producing butadiene from refinery gases made as an incident to the manufacture of 100-octane aviation gasoline. The process for making butadiene from refinery gas is known as 'butene dehydrogenation.'

"The plant we have just opened is the first of the so-called 'standardized' butene-dehydrogenation units under the government program."

The butadiene produced at Baton Rouge will be delivered for conversion to buna-S synthetic rubber, to a government plant which has just been finished adjacent to the Baton Rouge refinery. Any surplus of butadiene will be shipped to other government rubber plants. These plants have come to be known as "copolymer" plants because the butadiene is combined or copolymerized in them with smaller amounts of styrene to make the rubber.

Penn Grade Association To Meet at Pittsburgh

OIL CITY, Pa.—The twentieth annual meeting of the Pennsylvania Grade Crude Oil Association will be held in Pittsburgh, Pa., June 25. The meeting will be limited to a single day in keeping with the policies urged by the federal Government.

The principal speaker at the meeting will be Robert E. Allen, assistant deputy petroleum administrator, Washington, D. C., who is an authority on production matters. Mr. Allen will review the current situation with respect to crude supplies as a factor in the nation's war effort.

A discussion on present methods of crude production and possibilities for increasing the output from the Pennsylvania Grade region is planned as a supplementary part of the program.

Net Income of Oil Companies Declines 22.9 Per Cent in First Year of War

*by F. J. Sansone**

NEW YORK.—Aggregate net income of 32 leading oil companies for the year 1942 totaled $446,364,144, a decrease of $132,458,243 or 22.9 per cent from the total of $578,822,387 earned by these companies in 1941. Gross operating revenues of the group last year increased 8.2 per cent to a total of $5,622,513,909 as compared with $5,196,876,067 in the preceding year.

In addition to the increased operating costs and higher taxes which affected most industrial companies in the first full year of wartime operations, the oil industry's earnings were materially affected by the disruption of its normal transportation facilities which, together with the rubber shortage, was largely responsible for the restrictions imposed on the sale of petroleum products. The effect of these factors, however, was not uniform upon all companies and comparisons of individual earnings show a wide range depending upon the nature and location of their principal activities. In fact, 10 of the 32 companies reported higher net earnings in 1942 than in the year before.

In general, the solely producing companies and those most heavily interested in crude production made the most favorable showing and seven of the companies having increases were in this class. These were: Amerada Petroleum Corp., Barnsdall Oil Co., Ohio Oil Co., Pacific Western Oil Corp., Plymouth Oil Co., Seaboard Oil Co. and South Penn Oil Co. The favorable showing of the producing companies primarily reflected maintenance of crude production at close to the 1941 record level although the reduction in development expenditures due to restrictions on drilling also was a factor.

Pacific Coast companies, where operations were affected by large military demands, and companies with operations largely concentrated in the central and middle western states, where rationing was not imposed as early or as severely as on the eastern seaboard, were those making the next best showing. Standard Oil Co. of California, Mid-Continent Petroleum Corp. and Consolidated Oil Corp. (Sinclair), which also showed increases are in this group, as are the following companies which showed less than average declines: Continental Oil Co., Shell Union Oil Corp., Skelly Oil Co., Empire Gas & Fuel Co., Lion Oil Refining Co., Standard Oil Co. of Indiana, Standard Oil Co. of Ohio, Pure Oil Co. and Union Oil Co. of California.

The largest earnings declines were recorded by companies having large interests in refining and marketing on the East Coast and in foreign operations as they were the ones most seriously affected by the transportation shortage. This group, which includes several of the largest members of the industry, accounted for the major part of the decline in total earnings of the 32 companies. For example, Standard Oil Co. (New Jer-

*Carl H. Pforzheimer & Co., New York.

EARNINGS AND DIVIDENDS OF 32 OIL COMPANIES—1928-42

Year	Net income	Cash dividends
1942	$446,364,144	$244,053,844
1941	578,822,387	276,007,571
1940	412,157,371	231,415,557
1939	356,154,046	210,193,197
1938	341,083,662	220,897,663
1937	629,144,287	311,935,027
1936	458,820,512	251,625,745
1935	287,719,407	132,979,607
1934	182,341,148	142,716,146
1933	102,967,964	112,295,367
1932	82,144,076	168,413,161
1931	*73,445,526	239,083,852
1930	335,979,116	325,696,644
1929	638,158,233	325,221,476
1928	551,971,354	261,644,292

*Deficit.

PERCENTAGE CHANGE IN NET INCOMES OF 32 LEADING OPERATING CONCERNS

Company—	Net income 1942	Net income 1941	Per cent change
Amerada Petroleum Corp.	$3,271,885	$2,569,561	+27
Atlantic Refining Co.	6,799,024	14,346,229	—52
Barnsdall Oil Co.	2,801,846	*2,510,206	+12
Consolidated Oil Corp.	18,060,598	16,472,493	+10
Continental Oil Co.	14,924,698	15,398,082	—3
Empire Gas & Fuel Co.	7,452,369	7,926,669	—6
Gulf Oil Corp.	22,981,562	33,568,624	—31
Houston Oil Co.	1,149,315	1,352,886	—15
Humble Oil & Refining Co.	29,243,303	35,356,558	—17
Lion Oil Refining Co.	887,457	979,830	—9
Mid-Continent Petroleum Corp.	6,112,158	4,866,037	+25
Ohio Oil Co.	12,508,952	10,799,736	+16
Pacific Western Oil Co.	789,666	437,512	+80
Phillips Petroleum Co.	13,129,458	17,436,977	—25
Plymouth Oil Co.	1,774,145	1,546,895	+15
Pure Oil Co.	13,761,826	15,285,255	—10
Richfield Oil Corp.	3,646,441	4,323,611	—16
Seaboard Oil Co.	1,463,705	1,257,368	+16
Shell Union Oil Co.	16,860,006	17,334,214	—3
Skelly Oil Co.	5,632,805	5,913,826	—5
Socony-Vacuum Oil Co.	30,808,397	43,175,902	—29
South Penn Oil Co.	5,080,137	3,269,273	+55
Standard Oil Co. of California	30,558,547	29,909,421	+2
Standard Oil Co. of Indiana	44,183,894	48,385,967	—9
Standard Oil Co. of Kentucky	2,677,171	3,671,220	—27
Standard Oil Co. of New Jersey	83,361,920	140,572,419	—41
Standard Oil Co. of Ohio	5,649,880	6,249,444	—10
Sun Oil Co.	8,671,050	16,532,540	—47
Texas Co.	35,060,001	51,874,681	—32
Texas Pacific Coal & Oil Co.	860,669	1,179,630	—27
Tide Water Associated Oil Co.	10,663,930	15,584,093	—31
Union Oil Co. of California	5,537,329	6,239,232	—11

*Exclusive of $2,515,996 nonrecurring profit from sale of properties.

sey) net earnings of $83,361,920 in 1942 represented a decline of $57,210,499 from the $140,572,419 reported in 1941. This decline combined with that of the other leading East Coast operators, Socony-Vacuum Oil Co., Gulf Oil Corp., Sun Oil Co. and Atlantic Refining Co., amounted to $95,573,761 or 72 per cent of the total decline shown by the group of 32 companies.

Of the combined net earnings of $446,364,144 reported for 1942 by these companies, $244,053,844 was paid out in cash dividends during the year. The balance of $202,310,300 carried to surplus and reserves, together with the $75,778,905 charged against earnings for depreciation, depletion, amortization, etc., provided the bulk of the funds required for additional working capital and capital expenditures.

This is reflected in the accompanying summarized composite balance sheet for the group. It will be seen that aggregate assets increased $279,355,504 to total $9,740,849,231 at the end of 1942. While funded and long-term debt increased $94,062,126, this was more than offset by the increase of $171,158,727 in net current assets and the reduction of $27,791,800 in preferred stock.

COMPOSITE INCOME ACCOUNT AND BALANCE SHEET OF 32 MAJOR OIL COMPANIES

Income account—	1942	1941
Gross operating income	$5,622,513,909	$5,196,876,067
Depreciation, depletion, etc.	575,778,905	566,576,083
Provisions for income taxes	252,499,913	210,919,827
Net income	446,364,144	578,822,387
Cash dividends paid	244,053,844	276,007,571
Assets—	**1942**	**1941**
Properties, plant and equipment	$11,388,776,441	$11,203,365,085
Reserves for depreciation, depletion, etc.	5,822,479,232	5,680,372,390
Net fixed assets	$5,566,297,209	$5,522,992,695
Investments and advances	1,002,404,419	1,015,104,492
Miscellaneous assets	242,725,548	228,672,974
Current assets	2,929,422,055	2,694,723,566
Total assets	$9,740,849,231	$9,461,493,727
Liabilities—	**1942**	**1941**
Common stock	$3,695,816,012	$3,710,560,910
Preferred stock	213,672,237	241,464,137
Funded and long-term debt	1,255,592,242	1,161,530,116
Capital surplus	907,253,367	912,864,247
Earned surplus	1,901,825,483	1,739,778,546
Miscellaneous liabilities and reserves	835,708,510	854,854,153
Current liabilities	903,981,380	840,441,618
Total liabilities	$9,740,849,231	$9,461,493,727

DEATHS

Grant R. McCullough, 69, oil operator, banker, real estate operator and civic leader, died at his home in Tulsa, May 29. Death is attributed to a heart ailment. Mr. McCullough was born on a Missouri farm, and at the age of 16 began his banking career. He came to Tulsa in 1906, and 3 years later became president of the Bank of Oklahoma. In 1912 he became president of the First National Bank, retiring in 1928. Surviving, besides the widow, is a son, Carroll McCullough, with Deep Rock Oil Corp.

Homer E. Hall, 36, employe of Ellis Hall Sons Co., died at his home in Butler, Pa., last week. His widow and a son survive.

Ray Harris, line patrolman for Shell Pipe Line Co., was killed when the plane in which he was patrolling the company's line from Hobbs, N. M., to Big Spring, Tex., crashed 3 miles southeast of Wasson, Tex. The body was sent to Alton, Ill., for burial.

A. M. Carter, 67, oil worker of Carlisle, Tex., was killed in an autobile accident last week near Selman City, Tex.

J. L. Donahoe, 72, Tulsa, who had been engaged for many years in the oil drilling and producing business, died in a Tulsa hospital last Friday. He had been a resident of Tulsa since 1911. Two sons survive.

John Lewis Kirkpatrick, 44, an independent oil producer, died last week at his home in Tulsa. Mr. Kirkpatrick had been associated with Tide Water Oil Co. in New Orleans, La., until 4 months ago, when he returned to Tulsa, where he had formerly lived, to engage in business for himself. His widow, a son and two daughters survive.

Ross J. Sims, 60, Parkers Landing, Pa., tool dresser for Richard & Irwin Co., drillers for Forest Oil Co., died last week of a heart ailment. He is survived by his wife and eight children.

James C. McLaughlin, 106, who worked as an oil-field roustabout at 93, died last week in Los Angeles, Calif. Mr. McLaughlin was born in Ireland in 1837, came to the United States when he was 16, and had lived in California since 1889. For many years he was an employe of Shell Oil Co., Inc.

Scot G. Forney, district superintendent for Gulf Oil Corp. in charge of drilling and production, died last week at his home in Borger, Tex., after an illness of 15 months. Mr. Forney went to the Panhandle from Odessa, Tex., 10 years ago. He had been with Gulf for 33 years.

Charles E. Clancy, 68, who was chief clerk in the office of the vice president of Humble Oil & Refining Co., Houston, Tex., when he retired 8 years ago, died last week in a Houston hospital.

H. Hardie Robinson, retired oil operator and for 42 years a resident of Houston, Tex., died last week in that city. Mr. Robinson was born in Frankfort, Ky. He leaves his wife.

Joseph W. Rodenbaugh, 83, who followed the oil-producing business practically his entire life until his retirement 11 years ago, died in an Oil City, Pa., hospital last week, following an illness of 3 weeks. His home was in Rouseville, Pa., where he had lived for 73 years. Two daughters and a son survive.

John J. Hibbs, 66, who retired from drilling work about 10 years ago, died last week at Joplin, Mo. He had been ill some time. In 1904 Mr. Hibbs was one of the drilling crew for Perry Crossland, who was contractor in charge of the Glenn and Carson wells that further outlined the Fed Fork area, opened in 1901.

James Bell Martin, 78, Duke Center, Pa., died May 19, after a long illness. Mr. Martin went to western Pennsylvania in 1893 as an employe of United States Pipe Line Co., and for many years was a superintendent with that organization. Later he was associated for 15 years with National Transit Co. Mr. Martin was the father of the late Clifford Martin, former executive secretary of the Bradford district, Pennsylvania Oil Producers Association. A son and a daughter survive.

David L. Baird, a director of the Pennsylvania Grade Crude Oil Association, died in a Butler, Pa., hospital May 24, after a short illness. He was an oil producer and contractor, and had lived in Butler for 20 years.

Neutralization, Alloy Steels Used in HANDLING SOUR CRUDES

by J. P. O'Donnell

Neutralization of sour crude with soda ash (sodium carbonate) or other alkali solution or slurry is necessary as a preliminary treat to reduce corrosion. Ammonia in fractionating equipment helps to prevent corrosion later in the refining cycle. Alloy steels, such as cromoly, KA-S, etc., are necessary in distillation equipment, etc. The data in this article were secured from Standard Oil Co. of New Jersey as an aid to those refiners who may find it necessary to run sour crudes without previous experience.

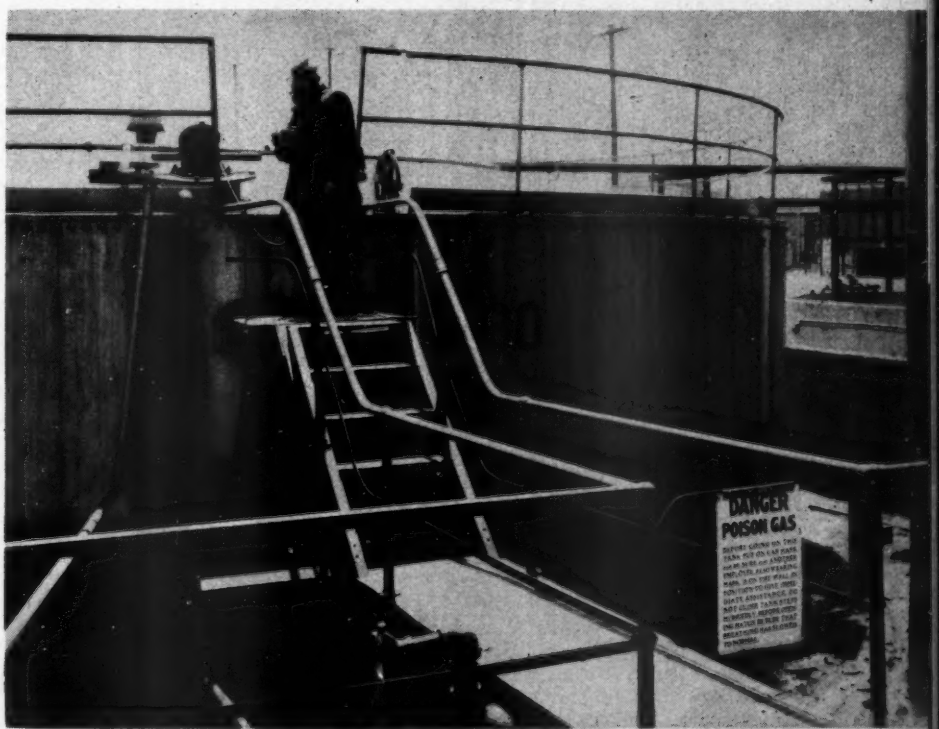
INDICATIONS that refineries in Districts 1 and 2 will find it necessary to run sour crude, probably of West Texas origin, are becoming increasingly evident. Because of this possibility, The Oil and Gas Journal sought a record of the experiences of a refinery in one of these districts which had handled sour crude without having been primarily designed to do so. Detailed information was made available by the Standard Oil Co. of New Jersey and is given here in abbreviated form. This company has operated District 1 refineries with large quantities of West Texas crude for a period of several years.

Difficulties in handling West Texas crude result principally from its high sulfur content, normally in the range of 1.5 to 2 per cent. As much as 15 per cent of this sulfur content may be H_2S, which makes it highly corrosive. In addition, H_2S is a dangerous, poisonous gas. Therefore, personnel protection, as well as equipment protection, is necessary. Equipment protection requires the use of chemicals and the installation of corrosion-resistant materials.

Salts Stimulate Corrosion

Since there is a wide range in the volume and character of the sulfur in this crude and since there are other factors affecting its degree of corrosiveness, the amount of neutralizing agent added must be carefully controlled and frequently varied as the character of the crude oil varies. In addition, the crude always contains varying quantities of salts which stimulate corrosion in proportion to the amounts present. The large quantities of salt normally associated with this crude develop HCl during distillation and the combination of H_2S and HCl is particularly damaging. When conditions permit, it is possible to reduce the amount of salt and water present by settling, the degree of elimination depending on the method followed.

The initial addition of a neutralizing agent was made at this refinery before the crude entered the pipe still. In a typical operation the treatment consisted of 0.071 lb. of Na_2CO_3 (calculated on a dry basis) per 100 gal. of crude oil. It was injected as a water solution containing ½ lb. per gal. of water. The agent was introduced ahead of the shell and tube preheaters in order to obtain a thorough mixing. Either caustic soda or lime could likewise be used for this purpose but the



Checking stocks for hydrogen sulfide content. Note warning sign on stairway gate

latter was found to be more difficult to handle because of the necessity for preparing a slurry. Treatment of the crude was undertaken principally to minimize HCl corrosion which was most damaging in the upper section of the flash tower and in the overhead vapor and distillate train. One other treatment was also made during the primary distillation. This consisted of the introduction of anhydrous ammonia into the overhead equipment to keep the water in the distillate stream at approximately 6.5 pH; 0.011 lb. of NH_3 per 100 gal. of feed were used in a typical case. Water should be simultaneously introduced to dissolve and remove the salts formed during neutralization, otherwise the equipment will be fouled.

Virgin naphtha from the crude tower was high in H_2S. This could be removed with NaOH though excessive amounts would be required, resulting in high costs. Removal was effected far more cheaply in the stabilizer where the H_2S was removed with the propane and this cut used as fuel. After stabilizing, it was found advisable to caustic wash the naphtha. In addition, if the sulfur level of the refinery was high, either sweetening or acid treating followed by soda washing was also practiced before rerunning. Processing by either of these methods also improved the octane number.

No burning oil was made from this crude and the gas oil, both light and heavy, was processed in the cracking coils.

The cracked gasoline was treated and rerun, the amount of acid used varying to maintain the desired sulfur level in the refinery. On rerunning the treated gasoline, the neutralizing agents described above were also used. Typical treatments were 0.214 lb. of NaOH per 100 gal. of feed which was introduced with the feed as a water solution containing 0.35 lb. per gal. and 0.023 lb. of NH_3 per 100 gal. in the overhead equipment.

Experience has indicated that the amount of corrosion experienced during the initial distillation of sour crude varies considerably with the type of equipment used. It is less severe when the crude is topped in shell stills since the H_2S goes overhead with the early products of distillation. There is thus a distinct advantage in removing the H_2S by preliminary distillation prior to feeding the stock to the pipe stills.

The following data illustrate corrosion experienced on a single flash pipe still operating on untopped West Texas crude. The upper preheater $\frac{7}{16}$-in. wall, 4-in. o.d. carbon steel and the lower preheater $\frac{5}{16}$-in. wall, 5 per cent cromoly tubes had an expected life of 3 to 10 years. The 6-in. o.d. $\frac{5}{16}$-in. wall, 5 per cent cromoly tubes initially installed in the radiant section had an actual life of 10 to 27 months. These tubes were replaced with KA_2S. The header boxes on this pipe still were 5 per cent cromoly and no replacements were required.

The coil outlet line was originally installed with extra strong carbon steel pipe which had an average life of 8 months, the replacement being 5 per cent cromoly which is satisfactory.

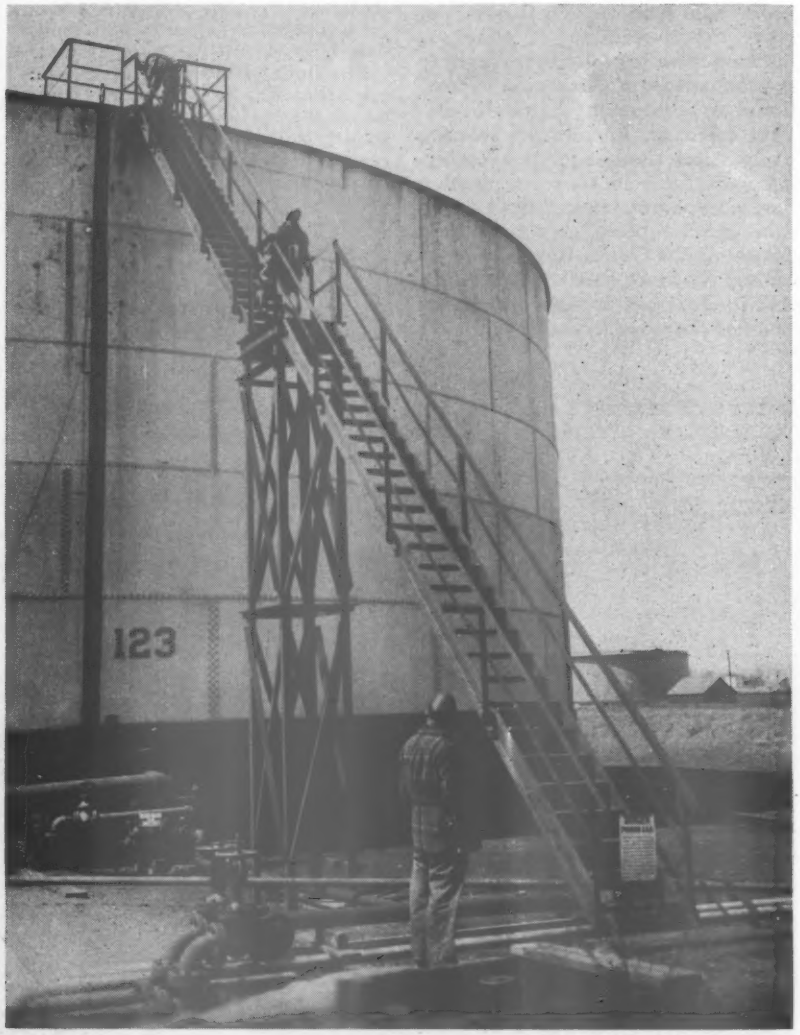
The crude flash and fractionating tower was fabricated with carbon steel. The bottom or reduced crude section experienced a loss rate of ⅛-in. per year and was subsequently lined with 11½-13 per cent chrome plug welded. Cast steel proved satisfactory for the bulk of the fractionating trays, with the exception of the bottom and top trays. The bottom trays were replaced with 11½-13 per cent chrome.

Hydrochloric acid corrosion was experienced in the top of the tower, resulting in a corrosion of 5/32 in. per year on the shell and replacements of the top fractionating tray. The shell section was protected against corrosion with monel and a monel tray was installed in the top of the tower.

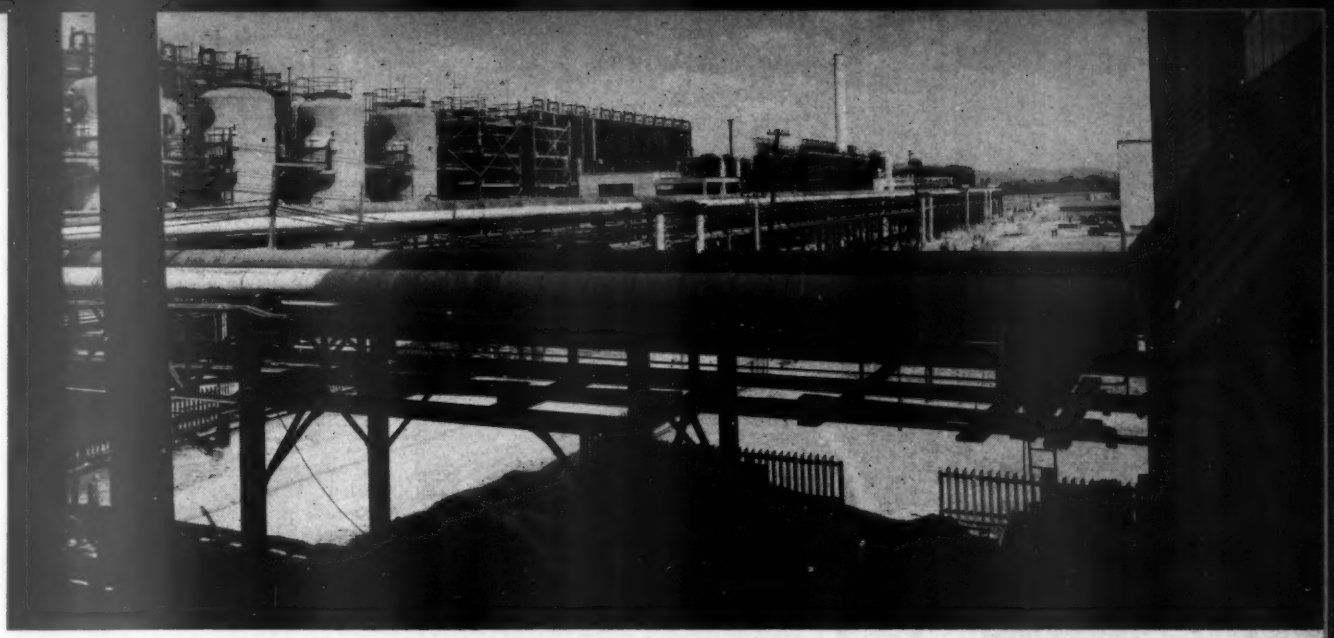
Corrosion was very spotty in the vapor line from the tower to the condenser, ranging from ⅛ to 1 in. per year. This line was ultimately replaced with solid monel pipe. Total metal loss in the steel shells of the final condensers averaged 1 in. per year with a maximum of 2 in. per year. The number of shell renewals was dependent on the corrosion allowance provided in the various replacements. These steel shells were eventually replaced with solid monel shells. Carbon steel rundown lines from the condensers to the distillate drum lasted approximately 9 to 12 months and they were ultimately replaced with monel. It was also necessary to partially line the distillate and reflux drum with monel.

Due to previous experience with

(Continued on Page 50)



Gaging sour-crude tanks in remote locations. Man on first platform renders first aid if gager is overcome, while third man on ground summons assistance



General view of part of facilities for the manufacture of butadiene and styrene involving use of more than 400 miles of piping

Utilities Are a Major Factor in Synthetic-Rubber Operations

by C. O. Willson

This report contains the available information covering the main features of the largest synthetic-rubber plant now in operation. The government project consists of two operations for the production of butadiene and styrene by Carbide & Carbon Chemicals Corp., and the manufacture of buna-S rubber from these intermediate products by United States Rubber Co.

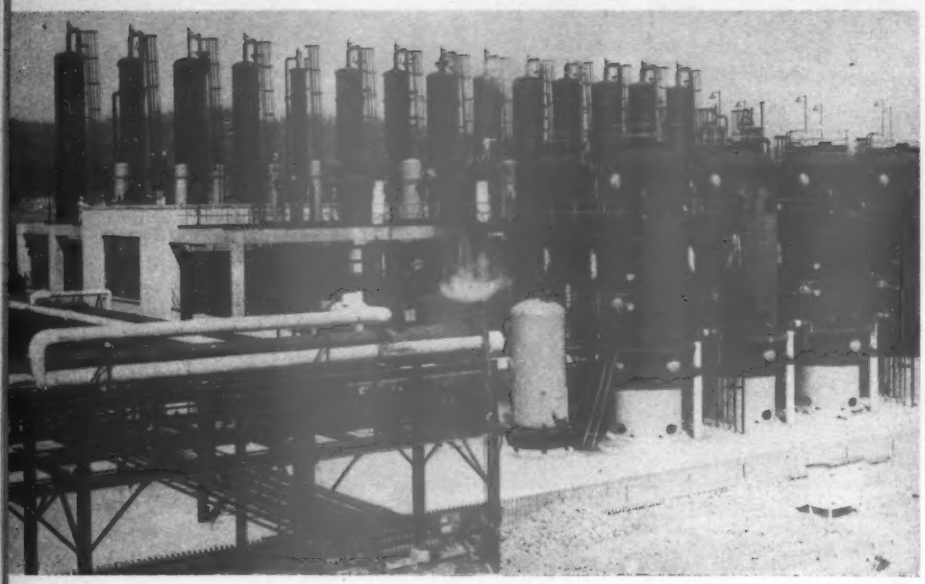
INSTITUTE, W. Va.—The magnitude of the manufacturing facilities involved in this country's synthetic-rubber program is clearly revealed in the complete $56,000,000 project now in operation here under the direction of the Carbide & Carbon Chemicals Corp. and the United States Rubber Co. The project, units of which have been operating since early in the year, is expected to be producing at its capacity of 90,000 long tons yearly of buna-S rubber, in July.

The size of the operations possibly can best be visualized by those who will not see the project until the emergency is over, through some of the utilities. The entire plant when in complete operation will require 120,000 gal. of water per minute, a supply which approximates the requirements of Los Angeles. It will consume 14,400 kw. of electricity, purchased from outside sources. For processing operations, 1,000,000 lb. of steam will be required hourly, a quantity sufficient to generate the electric-power requirements of a city the size of Indianapolis. A total of 7,700 tons of coal will be consumed daily in the generation of process steam, the equivalent of a 140-car train. The plant adjoins the Kanawha River from which the bulk of the water supply is obtained.

The operation known as the "Institute project" has three main divisions. One division is composed of four units to produce butadiene from grain alcohol with a second division consisting of two units to produce styrene from benzene and ethylene. These two divisions were designed and are operated for the Government by the Carbide & Carbon Chemicals Corp.

The third division which adjoins the

Meter and control room for one of the butadiene units



Distillation, conversion, and fractionating equipment for one butadiene unit

other two but which is operated separately except for certain utilities consists of a finishing or copolymer plant utilizing the butadiene and styrene. It was designed and is operated for the Government by the United States Rubber Co. The first two divisions were built by Ford, Bacon & Davis and the rubber plant by the Blaw-Knox Co.

Construction work on this mammoth project, which is located 12 miles from Charleston, W. Va., the oil and chemical manufacturing center of a large area, was started in April 1942. The first butadiene was produced January 29 this year and the first rubber output March 31. The significance of the project in the rubber program is indicated by the fact that when it is operating at capacity it will furnish approximately one-eighth of the synthetic-rubber program called for by Rubber Director Jeffers, at the close of this year. This project's output will be sufficient to furnish rubber for more than 16,000,000 passenger cars yearly.

Natural-Rubber Equivalent

It is pointed out that to produce this same quantity of natural rubber would require a plantation of 270,000 acres containing 24,000,000 trees which would not start producing until 5 years after they were planted. It is estimated that such a plantation would cost $80,000,000 and would require a labor force of 90,000 men. The Institute project will be operated by 1,250 employes.

The oil industry's only participation in this particular project is at one point. The ethylene gas used with benzene in the manufacture of styrene is piped to the project from the Charleston refinery of Carbide & Carbon Chemicals Corp. a distance of 5 miles. The Charleston refinery, which includes a Gyro vapor-phase cracking operation, has been largely operated as one of the chemical units of the owners. The Cabin Creek, W. Va., refinery of the Pure Oil Co., located in this area, has furnished the Carbide & Carbon Chemicals refinery with certain raw materials from petroleum for several years.

This butadiene operation differs from that based on petroleum in that at oil refineries butene gases from cracking operations are utilized, instead of grain alcohol. In this operation benzene for the manufacture of styrene is shipped here in tank cars from coke plants. The present program calls for the production of approximately 65 per cent of the required butadiene from petroleum hydrocarbons and the remainder from alcohol. It has been possible to complete the butadiene-from-alcohol plants more quickly than most of the petroleum operations largely because of the availability of alcohol from existing storage.

The chemical principles and formulas involved in the production of butadiene from grain alcohol and the production of styrene from benzene and ethylene have been explained in previous issues of The Oil and Gas Journal.* The same is true of the manufacture of synthetic rubber from butadiene and styrene.

Butadiene Operation

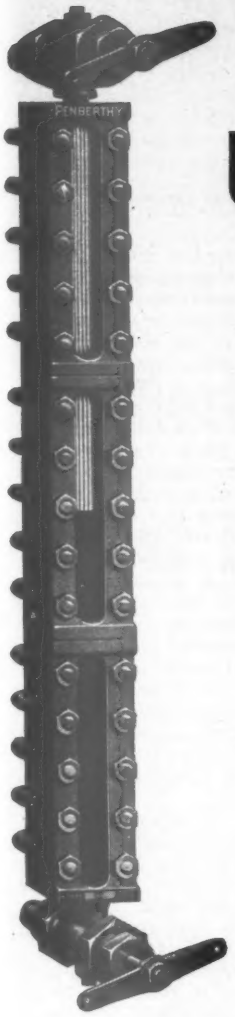
In this operation alcohol from storage passes through a series of converters where by the application of heat and the action of catalysts, a portion is converted to butadiene. Unreacted alcohol and intermediate products are removed for recycling through the converters in an extensive recovering system consisting of a number of distillation towers and scrubbers. The butadiene is purified by distilling and washing until it is over 98.5 per cent pure. This operation will require 197,000 gal. of alcohol daily.

Because butadiene boils below the freezing point of water and because of the wide variations in atmospheric temperatures it is necessary to store

*Rubber From Petroleum Issue, Nov. 26, 1942.

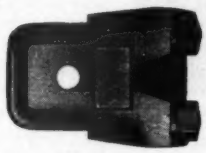
Compressor units which are part of a butadiene operation

QUALITY UNCOMPROMISED



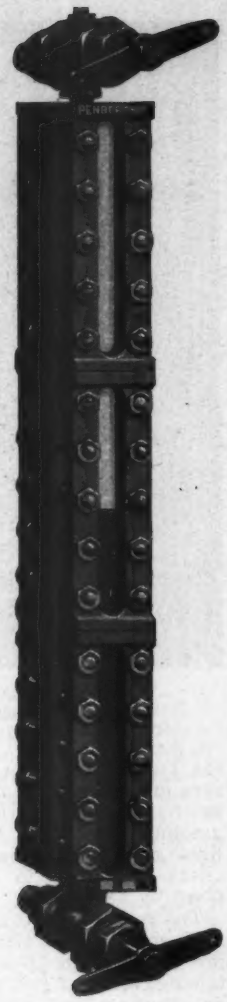
PENBERTHY *Reflex* DROP FORGED STEEL LIQUID LEVEL GAGES

Liquid shows black—empty space shows white. Preferred wherever liquid level must be easily and positively visible . . . and when liquids are under high pressure or at high temperature.



PENBERTHY *Transparent* DROP FORGED STEEL LIQUID LEVEL GAGES

Used to observe color and density of liquids under high pressures, and/or temperatures. Construction is exceptionally rugged . . . similar to Reflex types.



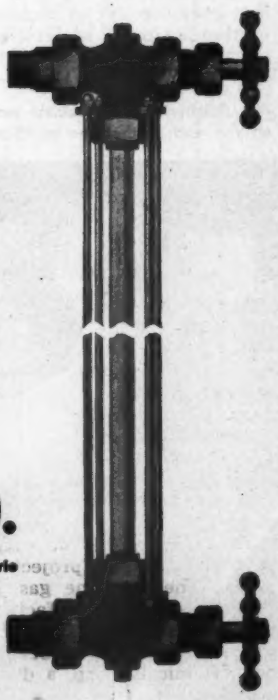
Penberthy Liquid Level Gages

PENBERTHY *Reflex* WATER GAGE SET

Water shows black—steam shows white. U-Bolt construction is strongest and simplest to service. Glass replaced by simply removing nuts on face of gage . . . unnecessary to work between gage and boiler.

PENBERTHY DROP FORGED STEEL LIQUID LEVEL GAGES

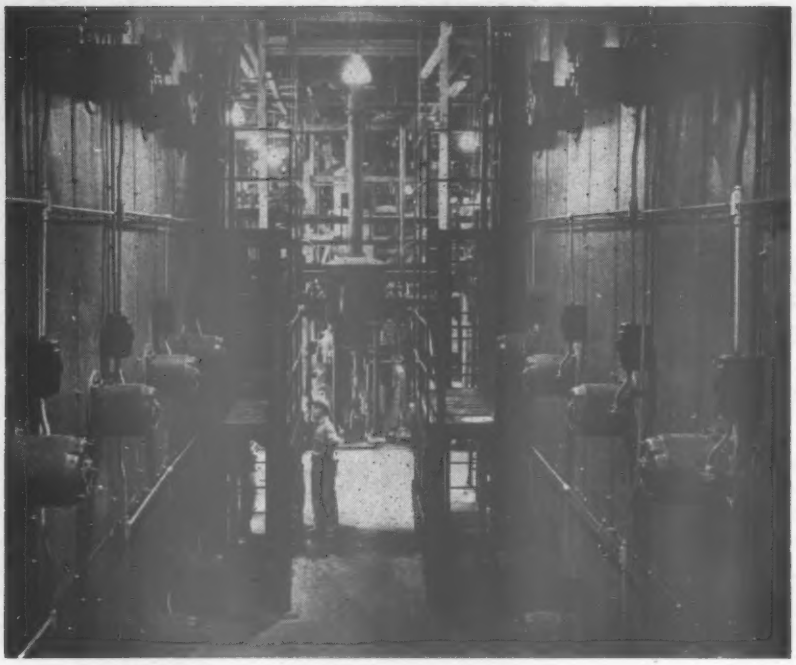
Made of Chromium-molybdenum alloy temperature-raising steel, extra heavy throughout. Stainless steel trimmed. Tubular glass type gages also available in various other metals suitable for practically all conditions.



PENBERTHY INJECTOR CO.

DETROIT, MICHIGAN • Canadian Plant; Windsor, Ontario

PENBERTHY PRODUCTS



Twelve large dryers which are part of the rubber manufacturing operation with capacity to evaporate 160 tons of water daily

the butadiene as liquid under pressure in containers of the same design as are used at refineries and natural-gasoline plants for the storage of light gasoline fractions. The butadiene is delivered to the copolymer plant by pipe line.

The benzol and ethylene are vaporized in stills and after fractionation are passed through converters containing catalysts. This reactor is called an alkylator and it is at this point that ethylbenzene is formed. This operation is similar in principle and application to that used in the production of cumene at several petroleum refineries. The ethylbenzene is removed from unreacted benzol and byproducts in a series of fractionating columns and held in intermediate storage tanks. From the latter the ethylbenzene is fed to a second set of reactors where in two steps, two hydrogen atoms are removed to form styrene. This product is purified by distillation and stored in tanks for delivery to the copolymer plant.

The distillation, reacting and conversion operations involved in these butadiene and styrene manufacturing procedures are similar in many respects to crude distillation and cracking operations at refineries. Large capacity in heat transfer and cooling operations is required. Most of these operations are controlled from central instrument rooms. The details of these operations have not been released.

Copolymer Operation

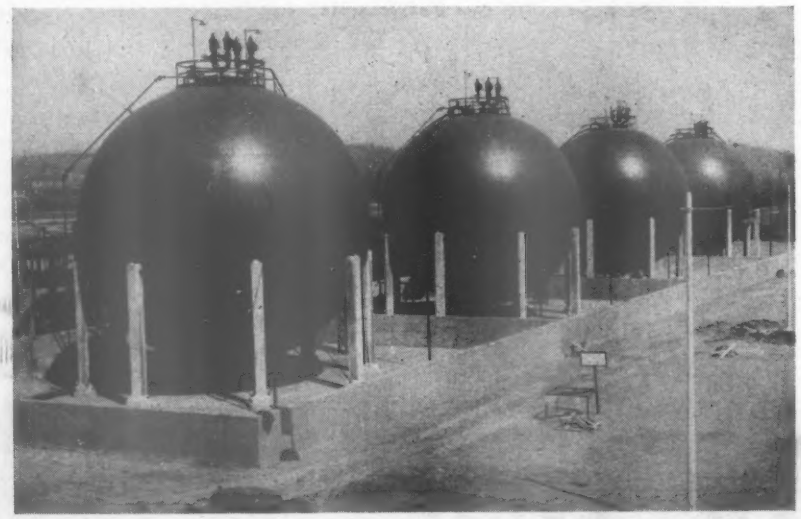
The coplymer plant briefly described is composed of three identical units each with capacity of 30,000 long tons of rubber annually. In addition to butadiene and styrene the main ingredients used in the manufacturing operation are soap, salt, acid, and caustic soda.

The process consists of mixing three parts of butadiene and one part styrene into seven parts of soapy water to form a milky liquid. The latex formed consists of tiny droplets composed of butadiene and styrene dispersed in soapy water. With heat and the addition of a catalyst these droplets are stirred in glass-lined pressure vessels until they copolymerize into solid rubberlike particles of buna-S. The unreacted butadiene and styrene are then boiled off the latex and recovered for reuse. The latex now containing tiny rubber particles instead of droplets, is pumped to a large blending tank where it is mixed with many other batches in order to assure uniformity.

The rubber particles are then brought together by adding salt and acid. The particles form curds and in this stage are screened and washed free of other ingredients. The curds are dried first by squeezing and then pass through a warm-air dryer. The operation is completed when the dried rubber is pressed in blocks of 75 lb. and placed in cardboard containers for shipping. Process control requires the taking of 1,800 samples daily of various kinds of analyses in the plant laboratories.

The finished buna-S rubber product comes off the end of the line in 75-lb. loaves

Pressure storage of butadiene is an important factor in synthetic-rubber operations



Construction picture taken on the Fresno Oil Co. Prideaux lease in Archer County, Texas, where a water flood is being inaugurated. Finished water tank is at left. Steel sloping roof on pump station allows filters to be set on raised platform

North Texas Operators Turning to Water Flooding to Increase Oil Recovery

by Harry F. Simons

The projects now in operation demonstrate conclusively that water flooding in this shallow sand is feasible. Low investment and operating costs assure their success.

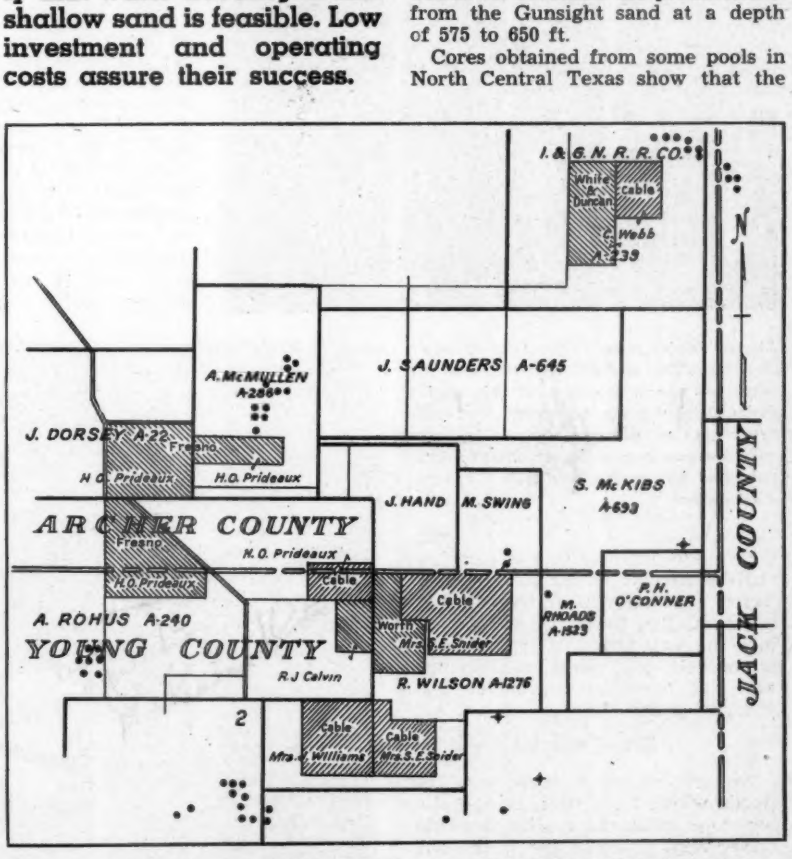
OVERSHADOWED on one hand by the huge production of the State of Texas and on the other by larger developments in secondary recovery in Pennsylvania, northeastern Oklahoma and southeastern Kansas, repressuring and water-flooding developments in Texas have not attracted much attention. North Central Texas, for instance, has for years been the scene of widespread gas repressuring and more recently a number of operators have turned to water flooding as a means of increasing oil recovery and prolonging the economic life of their properties.

The greatest concentration of water-flood projects in North Texas is in the Prideaux area of southeastern Archer and northwestern Young counties. However, these are not the only water floods in the area nor are they by any means the only prospects in North Central Texas. Some engineers who have studied water-flooding possibilities of the area consider it one of the outstanding sections of the country for the application of this technique. It is believed that there are at least 10,000 acres of first-class water-flood production which may be developed in the area and there is one district which is a "second Nowata" according to those familiar with the prospects.

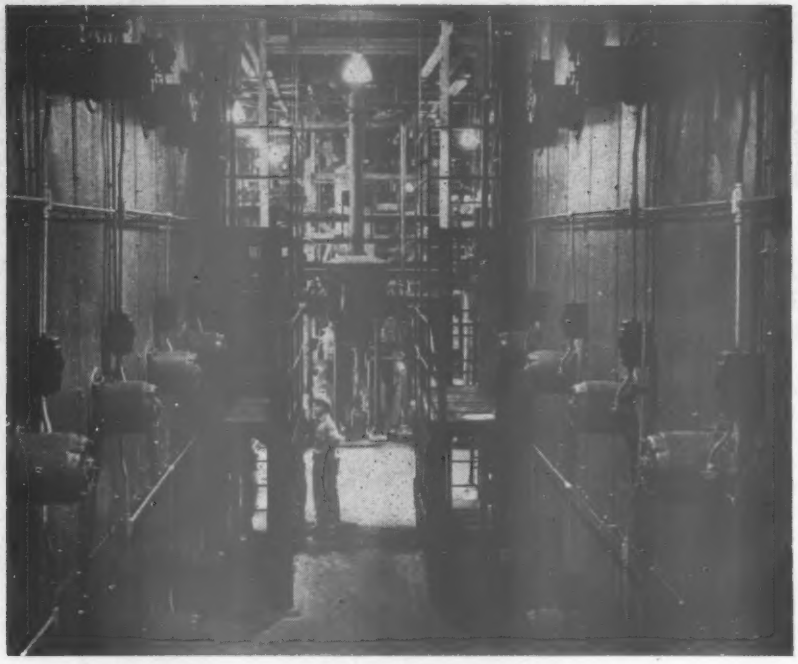
One of the factors contributing to the water-flooding potentialities is the structure of the pays. For the most part oil production is found in local lenses, folds, or noses, along major lines of folding. These produce rather small pools with high initial saturation and good closure.

The sands under the Gunsight lime are receiving the most attention in the Prideaux district, but sands other than the Gunsight are being water-flooded successfully in North Central Texas. At Prideaux the production is from the Gunsight sand at a depth of 575 to 650 ft.

Cores obtained from some pools in North Central Texas show that the



Map of portion of Archer and Young counties, in North Central Texas, showing location of water floods in the Prideaux area



Twelve large dryers which are part of the rubber manufacturing operation with capacity to evaporate 160 tons of water daily

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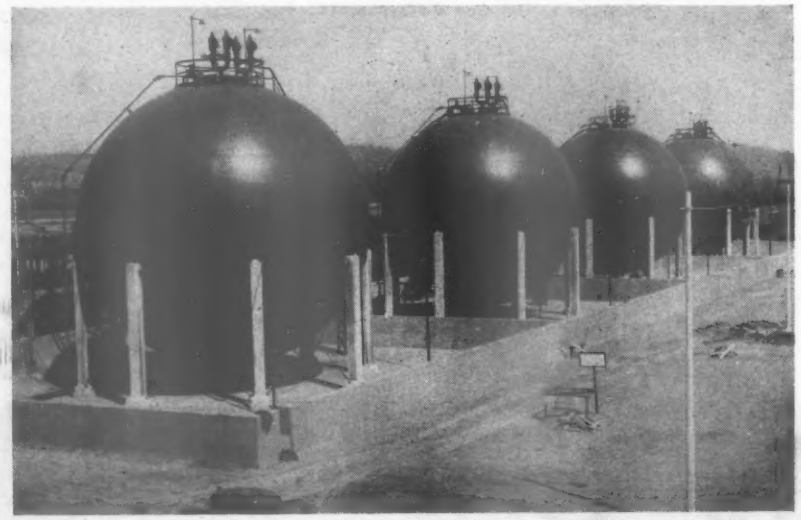

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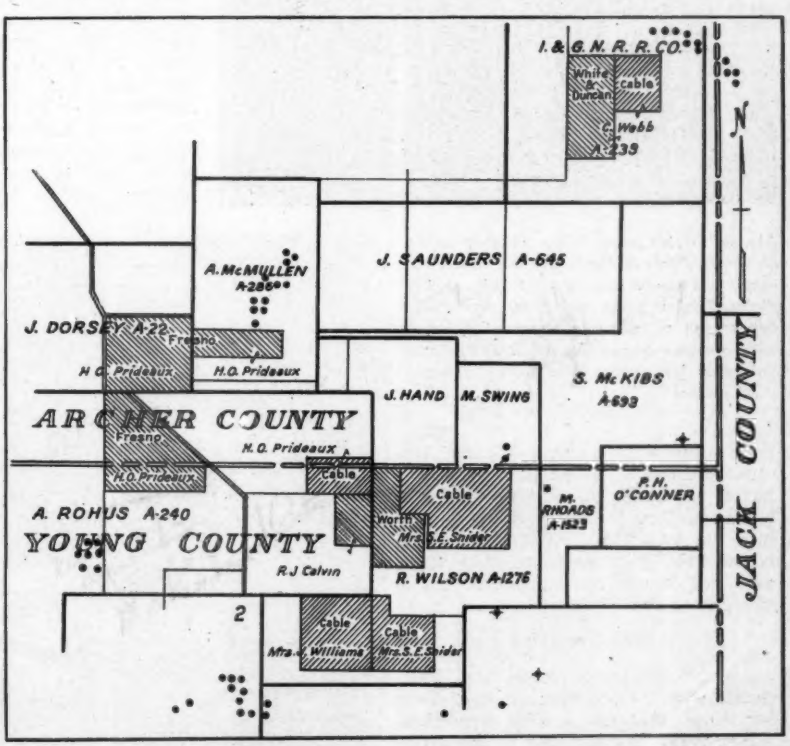


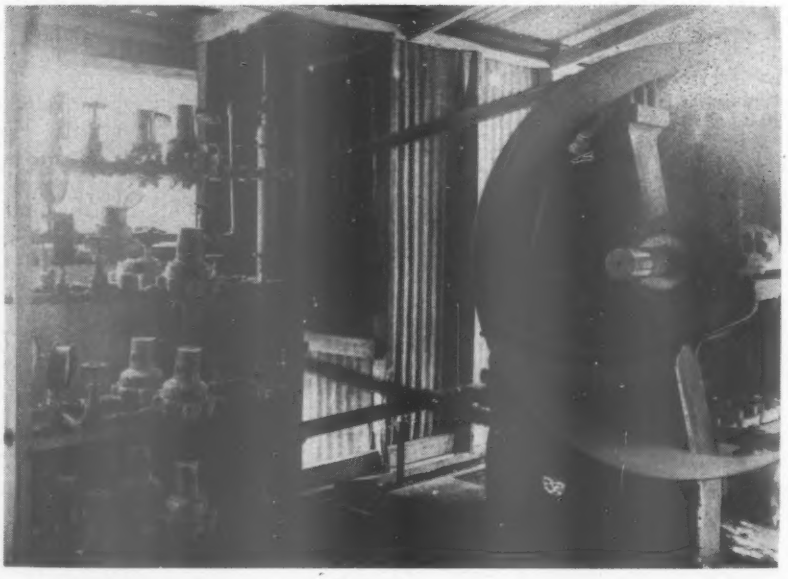
Map of portion of Archer and Young counties, in North Central Texas, showing location of water floods in the Prideaux area

pay is a rather pure, massive sand with practically no bedding planes although original drilling logged a sand with shale breaks. Thus a favorable structural condition is combined with a suitable sand composition to simplify the water-flooding operation.

In the Prideaux area, as in most of the North Central Texas fields, the pools are repressured after the primary production declines. Primary production in the area generally results in a recovery of 2,000 to 3,000 bbl. per acre in the shallow sands, repressuring will boost recovery to 3,000 to 5,000 bbl. per acre and water flooding is believed capable of raising the ultimate recovery to 4,500 to 8,000 bbl. per acre.

In some instances, repressuring has been instituted as soon as the wells are on production and compressors and gathering and distribution lines can be installed. When converting to water flooding, the operation of the lease under repressuring is continued until sufficient water has been injected to build up the pressure to where it stops the entry of air or gas into the pay zone. After that point is reached, gas injection is stopped and the operation continued as a straight water flood.

Above: Triplex pump being installed on water-flood project in North Central Texas. The pump will handle around 3,000 bbl. per day. Right: Triplex pump driven by an automotive engine at right and discharge manifold with pressure gages, meters and regulating valves at left on the Worth Oil Co. water-flood project



Five Projects

Around Prideaux there are four floods which have been in operation for some time and a fifth is getting under way. The last one is the largest and most comprehensive project attempted and is owned by the Fresno Oil Co. on the Prideaux lease. The others include the Duncan & White Webb lease, the Worth Oil Co. Snider, Calvin and Prideaux leases operated as one project and three projects of Cable Oil Co. on the Williams, Webb and Snider leases.

The technique used and the type of plants installed are similar as the water-flooding operations in each case have been under the supervision of Jo H. Cable, engineer, of Wichita Falls, Texas.

The Cable Oil Co. Snider flood was started early in 1937 following 7 years during which the lease was operated on air drive. When air was applied to the lease in 1930 the production rose from 16 to 35 bbl. per day and later to 45 bbl. per day. Since inaugurating the water flood production from the lease has been as high as 60 bbl. of oil per day and is now between 45 and 50 bbl. daily. There are six input wells and 24 producing wells on approximately 60 acres. The water-injection rate is around 500 bbl. per day.

The Williams flood of Cable Oil Co. was started in 1942 after the lease had been gas repressured for 5 years and produced as much as 70 bbl. per day. Maximum oil production since water flooding was 90 bbl. per day and it now produces 70 bbl. of oil per day but the production could be raised slightly. There are 4 input wells and 12 producing wells on the approximately 30 acres with the water input running around 200 bbl. per day.

The Webb lease of Cable Oil Co. was gas repressured soon after the lease was drilled and had a peak production of 120 bbl. per day under that method. Water flooding was started in August 1940 and a year later it became effective. Since that time 35,000 bbl. of oil have been recovered and daily average production is now 55 bbl. per day with 14 producing wells and 7 injection wells on approximately 30 acres. Water input is around 600 bbl. per day. This lease, incidentally, produced 120,000 bbl. of oil before the water flooding was started and it is believed there is another 65,000 bbl. remaining.

The Worth Oil Co. project includes six injection wells on the Snider lease, two on the Calvin and one on the Cable Prideaux lease. Water flooding of the Snider lease started in November of 1942 and is just now becoming effective. Total injection in the three leases is around 220 bbl. per day with the oil production averaging 32 bbl. per day.

The Fresno Oil Co. project on the Prideaux lease is just getting under way and comprises 125 acres with 45 producing wells and 17 injection wells which will be, or have recently been, drilled. The property was originally developed in 1926 and has been repressured with gas for a number of years.

The Duncan & White Webb lease which is being water flooded includes approximately 50 acres, 4 injection wells and 10 producing wells. The average daily water injection amounts to 500 bbl. per day and the oil production averages 65 bbl. daily. The lease was gas repressured for 6 years before water flooding was started in 1940.

Practically all of the leases were

originally developed on a spacing of a little over 300 ft. between wells. The general plan is to five spot with the injection wells being located in the center of the four wells.

Use Subsurface Water

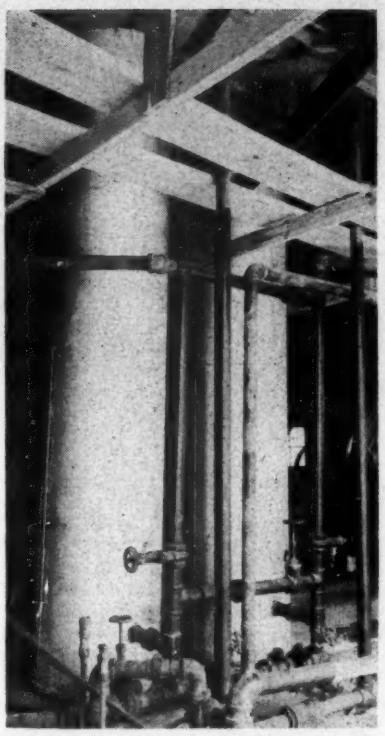
In contrast to a number of water floods, the projects in the Prideaux area use water obtained from shallower wells for injection purposes. This has a number of advantages, the main one being that its chemical composition is constant and consequently an adequate treatment can be designed. Lifting costs have not been found to be excessive. The water-zone is found at 350 to 400 ft., the water being lifted with jack and sucker rods operated from the central power through a rod line. These water wells are equipped with a 6-in. working barrel, 4-in. tubing and ⅞-in. sucker rods. The oil wells in the area do not produce salt water but a brackish water which is almost palatable.

The water from the wells is pumped into a 1,600-bbl. wooden tank used as a reservoir. The tank is also equipped with a small aerating tower over which the water passes. Some alum is added to eliminate the algae and the pH is controlled with hydrated lime. The water from the storage then passes by gravity through a 2 by 8-ft. filter filled with graduated gravel, sand, fine anthracite coal and a blanket of ferric chloride coagulent. The filter is equipped with a float control which keeps it full at all times. Finished water is stored in a 250-bbl. tank. A wash-back line from the finished water tank is connected through the pump to the filters. From two to eight filters are used, depending on the volume of water needed.

The maximum injection pressure expected is less than 550 lb. per sq. in., but the triplex pumps used are capable of a greater output. These pumps have an 8-in. stroke and either a 3½-in. or a 3-in. bore and will handle 2,000 to 3,000 bbl. per day at 50 r.p.m. The pumps are generally equipped with brass pistons. Engines for driving the pumps range from 15 to 25 hp.

Separate 1-in. or 2-in. lines run from the pump station to each of the injection wells. The manifold at the pump station includes the necessary regulating valves, pressure gages and recording 1-in. water meters so that it is possible to control the rate of injection and the pressure from a central point. Water-injection data can be obtained there. Generally, approximately 10 bbl. of water is injected to 1 bbl. of oil produced.

The injection wells used on the Prideaux projects are drilled for that specific purpose. They are drilled with cable tools and 6-in. pipe run to below the water zone which is just above the pay horizon. Two-inch tubing with a packer is then run and the packer set in the open hole below the pipe and the water zone. The 2-inch tubing below the packer is perforated to allow entry of the water into the formation. Cement is placed above the packer to insure a seal and the casing is then pulled from the hole and the annular space filled with mud.

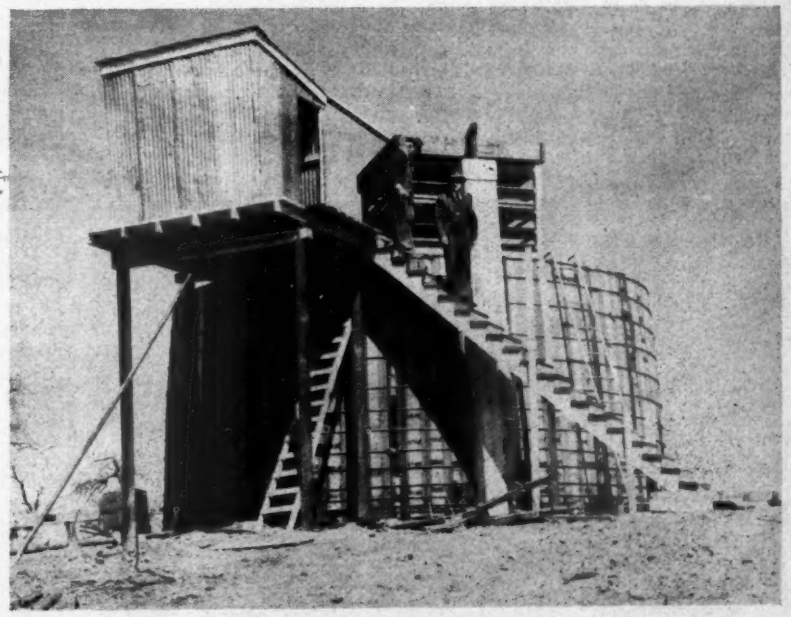


Low-pressure filters such as are used for cleaning water before it is pumped to the injection wells on a North Texas water flood. The water passes through a blanket of ferric chloride coagulant, graduated gravel, sand and anthracite coal

Producing wells are cleaned out if advisable before water flooding is started and are equipped with the usual producing equipment consisting of a tubing and rod string. However, a flood nipple is also used which prevents the wells from being pumped so low that the producing formation is exposed. The pump is located immediately above the producing horizon with a nipple extending almost to the bottom of the hole. This nipple is perforated near bottom so the production handled by the pump must enter there. Just below the pump there is a small hole through the nipple and as long as the fluid is above this hole the pump handles fluid but as soon as the fluid level recedes and exposes the hole the pump gets only air from the annular space.

Each tank battery is equipped with one and sometimes two oil-water separators. These are cylindrical tanks about 2 ft. in diameter and 18 ft. high. Production enters these tanks several feet above bottom and the water is drawn off at the bottom. It may be run either to disposal storage or, if clean, returned to the water makeup.

So far there has been no indication that the water drive is not progressing evenly on any of the floods at Prideaux. The injection ratios and the production ratios are watched closely and if a well begins producing too much water it is cut back immediately. Injection pressures are extremely uneven, showing that the effective permeability is highly variable.



Raw water tank with aerating tower into which water is pumped from wells. Small building houses necessary chemicals for treating water

Central Material Yards Protect Equipment From Loss and Damage

THE need for getting maximum service and life from equipment has led oil operators to pay greater attention to proper care and handling of equipment not in use. Instead of leaving idle equipment and materials lying scattered around leases where it can become lost or be forgotten, or might rust and deteriorate, many operators, where possible, now provide central yards where facilities can be installed for the proper storage of equipment, and where all materials and supplies can be kept in order and a systematic check kept of them. One such yard, owned by a major company operating in Indiana, is shown in the accompanying picture. It includes a cleaning vat where tools, fittings, valves and other such parts can be adequately cleaned before reuse or storing.

OPERATING IDEAS

Rebuilding Worn Rotary Brake Drums

BADLY worn rotary brake drums have been successfully rebuilt for an Oklahoma City operator in a local machine shop by welding on a ½-in. thick steel band. The band is welded on each edge around the drum. Holes then are drilled every 12 in. around the face of the band, where the band is spot-welded to the drum. The face of the band then is machined to the desired measurements and ground to a high polish, giving the drum the same wearing surface as when new. The accompanying picture shows a worn brake drum (left), and a similar drum with welded band before machining (right).

Header for Trapping Gas Condensate in Field Lines

OFTEN the velocity of gas in field gathering lines is so high that only a portion of the condensate is trapped in the drip although the drip may be located in the lowest place on a line. Effective results, however, have been obtained by the header shown in the accompanying picture. It consists of a piece of welded pipe much larger in diameter than the pipe in the line and is placed at right angles to the line. The effect of changing the direction of the flow and materially slowing down the velocity of the gas permits the condensate, even in spray form, to precipitate and accumulate in the drip that is connected to the header. In hot weather when rust starts to move in the vacuum lines, this header affords an effective means of collecting dust and rust particles.

Method of Testing Elasticity of Synthetic Rubbers at Low Temperatures

*by George D. Kish**

Low temperatures cause embrittlement of natural and synthetic rubbers which may result in enforced shutting down of pipe lines or other equipment containing rubber. A simple device, the Elastensometer, has been developed which tests the elasticity of rubber at various temperatures, as described in this article. The author, George D. Kish, is development engineer of Dresser Manufacturing Co. He is a native of the Bradford oil-producing country and is a graduate of Allegheny College, Meadville, Pa. Mr. Kish has been instrumental in developing many new products for his company as well as converting their peacetime products to war use.

WITH the appearance of many new synthetic-rubber compounds the need arose for quick and practical testing of these materials to determine their comparative applicability for uses formerly filled by natural-rubber compounds. One of the most important points to be determined in regard to these synthetic-rubber compounds was their elastic behavior at low temperatures. In many applications such information was of an imperative nature when these synthetics were to be introduced into the design of a new product. To obtain this data accurately we devised an instrument which we called an "Elastensometer."

Dresser coupling gaskets, compounded with natural rubber, have made possible pressure-tight joints in gas, water, and oil pipe lines for as long as 60 years without replacement. This type of coupling utilizes wedge-section gaskets. The flexing of these rubber-section gaskets permit, in the coupling, a movement of the pipe caused by temperature changes, soil settlement, and other disturbances, yet maintain a perfect seal and connection. The investigation of various synthetic compounds for use as coupling gaskets during the present emergency, therefore, presented serious testing problems, in order to assure the maintenance of high quality and long life in service.

Embrittlement of Synthetics

A compound which has the satisfactory physical characteristics required for gasket material must retain those qualities under extreme conditions of temperature, in order to be acceptable. It has been found, for example, that some synthetic compounds, while exhibiting satisfactory characteristics in other respects, will become brittle as glass at temperatures somewhat below the freezing point of water.

The vital nature of rubber in pipeline installations of gas, water, oil and gasoline lines serving the war industry and the nation cannot be overestimated when it is realized that such installations are public-utility services which must give continuous and permanent service. Failure of a pipe line at only one point may mean not only the loss of thousands of dollars but the slowdown, and possible shutdown, of numerous war-production plants whose processes depend on gas, oil, or water. The dramatic role of a very small amount of rubber in an underground pipe line is not easy to visualize, yet the absence of that small piece of rubber frequently spells failure because steel, by itself, is not a reliable material for absorbing soil stresses, many of which are directly due to variations in temperature. The research effort of American rubber manufacturers has produced synthetic-rubber compounds which will not only replace natural rubber but, in many cases, offer an improvement in product performance. However, the many new synthetic compounds have to be carefully tested to determine those best suited for the individual application. The Elastensometer, which permitted us to determine the "freeze resistance" of these synthetics, has been very successful in filling this need for such data. The principle of this instrument is illustrated diagramatically in Fig. 1. Utilization is made of the fact that, for rubberlike materials in general, the modulus of elasticity varies inversely with the temperature, as the temperature is lowered. A sample of the material to be tested is supported in the form of a simple beam (B), 0.290 in. in diameter by 1½ in. long, free supported over anvils (AA) placed 1 in. apart and centrally located at (H). The force (F) required to produce a given constant deflection (D) is transmitted through spring (T) and indicated on scale (P). Knowing the value of (F) at intervals of temperature, as the temperature of the test bar is dropped, a force-temperature curve can be plotted. The critical limit of normal elastic properties is reached at such temperature where the force required to produce constant deflection increases rapidly.

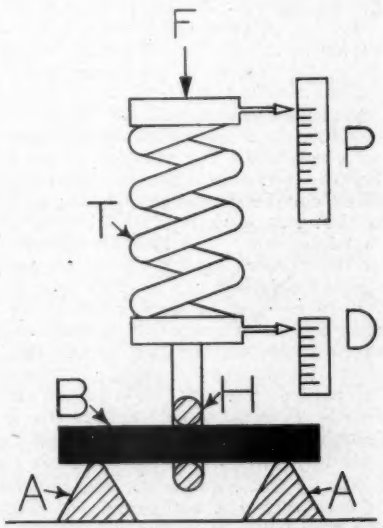


Fig. 1—Diagrammatic illustration of the operating principle of the Elastensometer

Construction of Instrument

Fig. 2 shows the Elastensometer as constructed. A dial indicator is direct-connected to the loading rod and shows the deflection in thousandths of an inch. Loading is applied with a hand lever and is transmitted to the test bar through a double-wound spring. Calibration of the loading spring for values indicated on the vertical scale was made directly by unscrewing the anvil plate and mounting the instrument on a pipe fixture over the platform of a weighing scale. A suitably encased thermometer is mounted close-grouped with the deflection dial and force scale for easy

reading of all three. The instrument weighs less than 5 lb. and was designed to be supported in the left hand while being operated with the right.

A layout of the complete equipment required for testing is illustrated in Fig. 2. This includes the Elastensometer, insulated cup, splash pan, cracked dry ice, alcohol, a hollow cutter for making 0.290-in. diameter by 1½-in. long test specimens, spoon for handling the dry ice, and tongs for inserting the test specimen into the anvils.

Conducting a Test

To conduct a test, the sample is inserted into the anvil, Fig. 3, and through the looped end of the loading rod; since 1 in. of the 1½-in. length is unsupported, ¼ in. of support is obtained on each anvil and the test bar is prevented from slipping out by means of removable pins. Testing is begun with the base of the instrument immersed in a cup of alcohol at room temperature. The technique of the test is to apply a sufficient load with the hand lever to produce a given deflection; the indicated force and temperature are then noted and the load is allowed to return to zero. This process is repeated at suitable intervals as the temperature is carefully lowered by the addition of small quantities of dry ice to the alcohol until the desired low temperature is obtained. Stirring is accomplished as required by raising and lowering the instrument, thus allowing the coolant to flow through holes in the base plate.

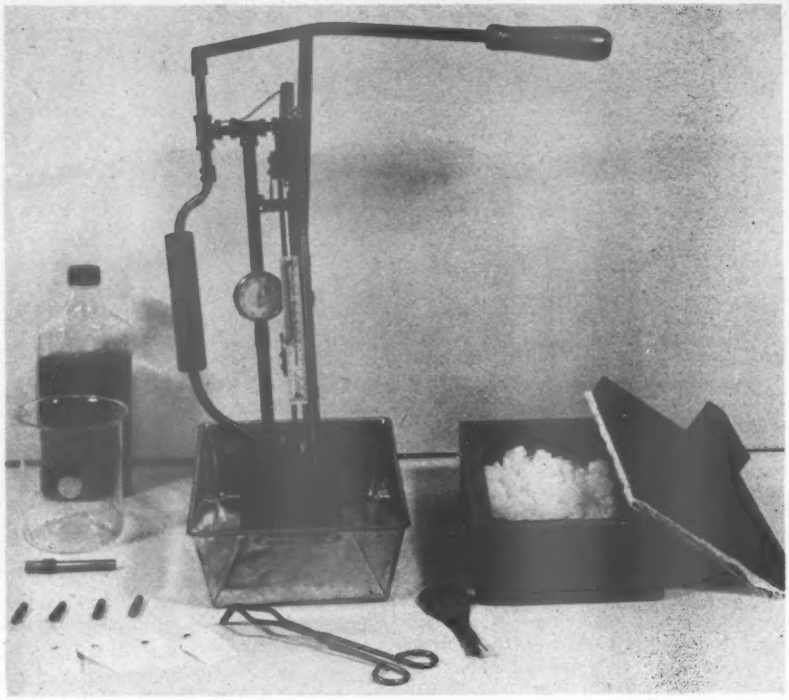
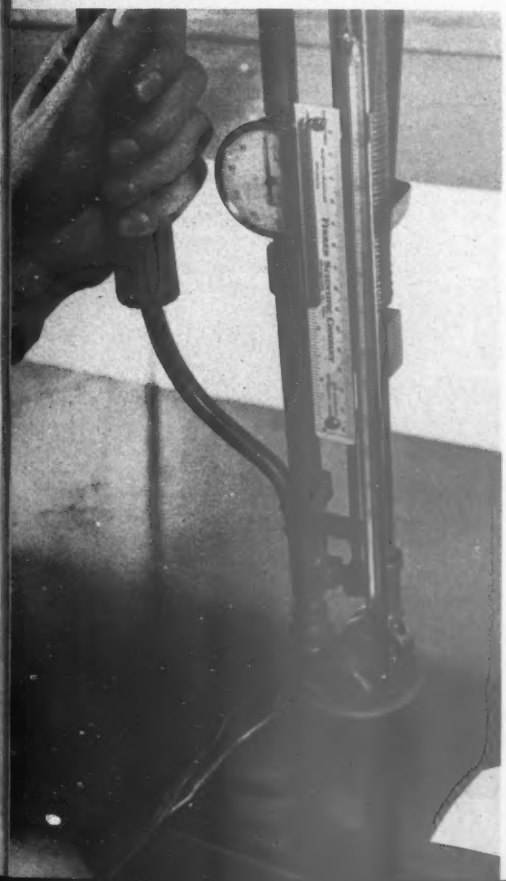


Fig. 2—Complete layout of equipment required for testing: Elastensometer, insulated cup, splash pan, box of cracked "Dory Ice," alcohol, hollow cutter, test specimens, forceps and a spoon

Fig. 3—Inserting a test specimen into the supporting anvils of the Elastensometer



The Elastensometer was designed to provide economy of time and material and ease of operation. First consideration in this respect was to achieve simplicity in preparation of the test specimen. This was accomplished by cutting the specimen with a hollow cutter operated in a drill press. By this method uniform cylindrical pieces 0.290-in. diameter by 1½ in. long can be produced from any part of a plaque of the compound to be tested. If desired, a numerical value for the modulus of elasticity in bending can be determined for any temperature since testing can be conducted even when the material is in a brittle state. (Tests at high temperatures can be conducted by use of a heated cup with or without an immersion fluid.) The operational base of the device, together with the test specimen, is compact enough to permit immersion in an insulated cup only 300 cc. capacity. Further advantage of the method lies in the fact that comparatively small testing forces are required, as opposed to tensile pulling, which makes for a light, easily handled and hand-operated instrument.

Figs. 4 and 5 represent test results of two different compounds of like characteristics at room temperature, but widely differing at low temperatures. In each case two curves are represented, showing effect of different values chosen for deflection (D). To provide quickly made comparative results the same deflection must, of course, be applied to all tests. Points (X,X^1) on the curves indicate the critical limit as determined by inspection. The critical limit as referred to in this reference is defined as that temperature at which the modulus of elasticity begins to increase at a rapid rate. By plotting values of force required to produce a constant deflection against temperature, the first sudden change of curvature indicates the critical limit.

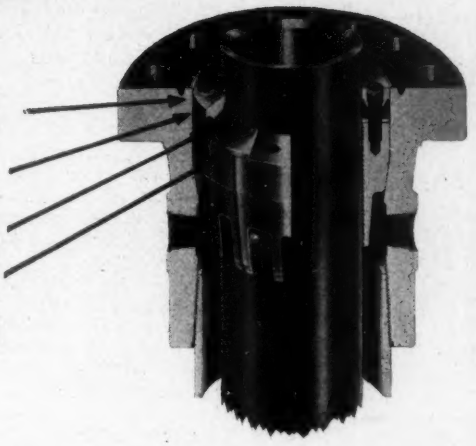
Choice of Deflection

Factors affecting the choice of deflection (D) are:

1. The maximum value which will not cause a permanent set at the testing temperatures, remembering that the modulus of elasticity tends to increase as the temperature is lowered.
2. The minimum value which will show marked change of curvature at the critical values of temperature. If (D) is too small, significant points on the curve may escape visual detection.

In general, the maximum value of (D) which will not cause a permanent set, i.e., exhibit negligible time lag in achieving full recovery, is used. D = 0.050 in. has been found to be of ample range for practically all commercial synthetic rubbers produced thus far where the critical limit is of chief interest. For studies

THE *Improved* TYPE "W" SEAL FOR CAMERON CASING HEADS



Resilient neoprene-asbestos seal ring is expanded by tightening 9 socket head cap screws which screw directly into the top of the slips.

Split packing gland.

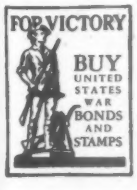
Neoprene-asbestos seal ring.

Steel packing retainer plates moulded to the packing prevent packing from flowing down between the slip segments. Packing can only expand laterally against the pipe and casing head housing.

A Safe and Easy Seal for Hard-to-Weld Casing

Wherever Grade N-80 or other high carbon steel casing is used, making it difficult to obtain a dependable welded seal of the space between casing strings, the improved Cameron Type "W" Seal may be used with complete confidence.

The sound design of the Type "W" Seal is clearly illustrated in the accompanying cross-section view of a Cameron Casing Head. Note how steel retainer plates, moulded to the bottom of the resilient packing ring, bridge the gaps between the three slip segments. Thus, when sealing pressure is applied to the resilient packing by tightening the socket-head cap screws, the packing can only expand laterally . . . between the pipe and the casing head body. There are no exposed threads on the inside diameter of the casing head to be damaged by the drilling tools. The bolted type packing gland permits higher compression in the packing than is possible with a screwed type gland.



In high pressure areas where a pre-tested and repackable seal of the space between casing strings is desired, the Cameron Type "WM" Testing Flange is recommended for use with the Type "W" Seal. This Testing Flange employs a repackable plastic packing seal which permits the application of hydraulic test pressure to the resilient seal. The test seal may be repacked at any future time without disturbing the surface connections by simply injecting more plastic through the check valve-equipped port in the Testing Flange.

CAMERON IRON WORKS, INC.

711 MILBY ST., HOUSTON, TEXAS

***Export*—74 Trinity Place, New York, N. Y.; *California*—Howard Supply Co., Los Angeles; *Rocky Mountain*—Mountain Sales and Service, Casper, Wyoming.**

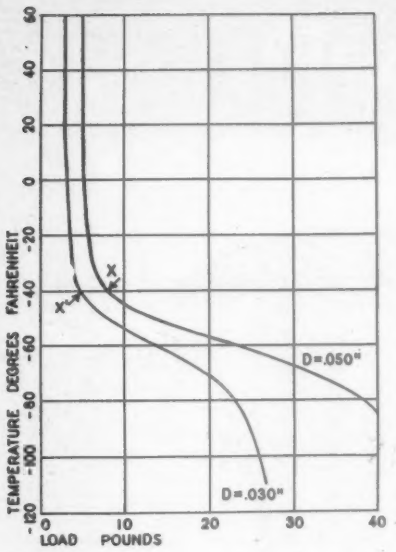


Fig. 4—Test results of a typical safe low-temperature material

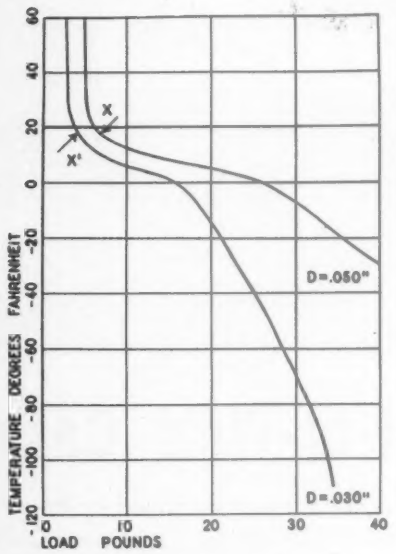


Fig. 5—Test results of a typical unsafe low-temperature material

considerably below the critical limit a smaller value, as for example, D = 0.030 in., is used.

A descriptive scale of interpretation may be applied to the D = 0.050 in. curve as follows:

0 to 8 lb—Flexible
8 to 15 lb.—Semiflexible
15 to 22 lb.—Firm
22 to 30 lb.—Hard
30 to 40 lb.—Brittle

Descriptive scales of elastic behavior for other values of (D) below the critical limit are, in general, chiefly dependent on the nature of the application. Where the material is almost completely confined, as is the case with Dresser coupling gaskets, the "semiflexible" state is in the safe zone. For such applications as automobile tires, for example, where there is no confinement and the material is directly exposed to wear, the critical limit would probably define the safe temperature limit, and might require closer definition.

The modulus of elasticity (E), in bending, at any temperature may be obtained by the use of the conventional beam deflection formula:

$$E = \frac{P\,L^3}{48\,I\,D} \qquad (1)$$

Where P = load in pounds (applied gradually), L = length (=1 in.), I = moment of inertia of cross-section about the neutral axis (= 0.04909 d⁴), and D = deflection in inches.

Since the modulus of elasticity in bending (E) tends to increase as the temperature is lowered, Fig. 6, the limiting critical temperature as obtained with the Elastensometer may be closely defined as that temperature where the normal value for (E) increases to the maximum value permitted for the application. For materials exhibiting given elastic characteristics at normal temperatures, the tolerable deviation at the limiting temperature may be specified in percentage of increase in (E). For example, rewriting Equation 1:

$$E = K\,P/D \qquad (2)$$

Where

$$K = L^3/48\,I \qquad (3)$$

Using the values plotted in Fig. 4 for a test specimen whose diameter is 0.290 in.,

$$K = \frac{1}{48 \times 0.04909 \times 0.290^4} \qquad (4)$$

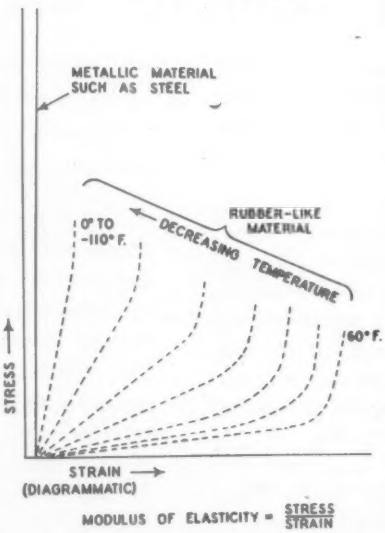


Fig. 6—Diagrammatic illustration of the changing values of E (modulus of elasticity) of rubberlike material with decreasing temperature

= 60, and a table of values may be constructed as follows:

Temp., °F.	E	Pct. incr. of E
*60	6,000	0
—20	7,200	20
—37	8,400	40
—40	9,600	†60
—45	12,000	100
—57	24,000	300
—68	36,000	500
—85	48,000	700

*Taken as normal.
†Typical critical limit selected by visual inspection: points X, X', Fig. 4.

While the critical limit may thus be specified mathematically, determination by visual inspection is usually adequate. Good results may be obtained with comparatively large tolerances on the diameter of the test specimen.

Tests made with the Elastensometer have been found convenient and inexpensive to conduct, as no great outlay of equipment is required. A sample compound can usually be tested in 30 minutes, including the time required for cutting the test specimen in a drill press.

Four Chinese Engineers Training With Oil Firms

Four Chinese engineers, part of a contingent of 32 who hope someday to help rebuild industrial China, have been placed with oil firms to study American engineefing techniques. Training positions with operating subsidiaries of Standard Oil Co. (New Jersey) were arranged through the Board of Economic Warfare.

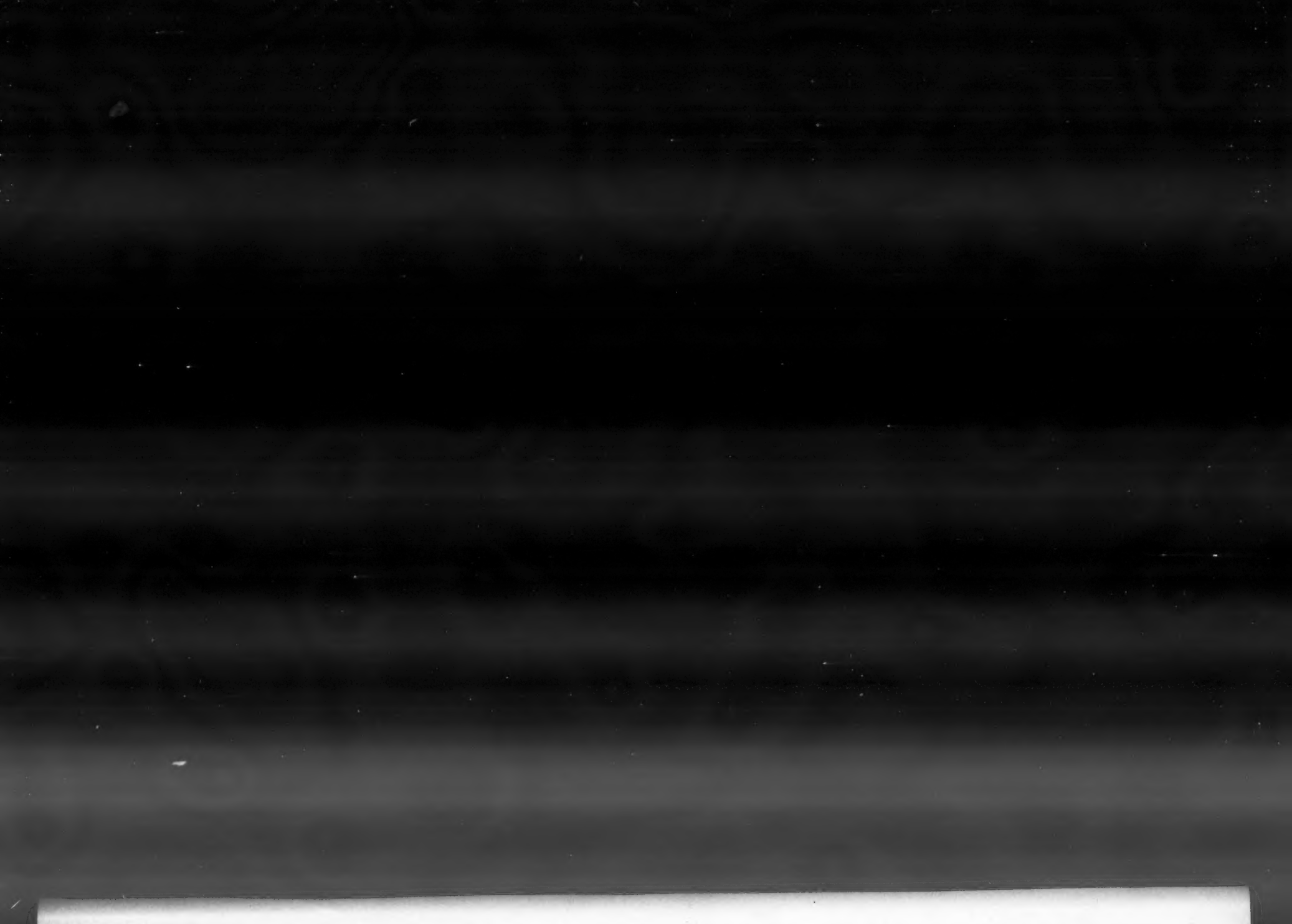
The petroleum engineers, their special fields and the places of training are: Y. C. Tung, well drilling, Humble Oil & Refining Co., Houston, Tex.; S. Y. Hsiung, refining, Standard Oil Co. of New Jersey, Elizabeth, N. J.; S. Y. Wong, oil piping, Humble, Houston; C. C. Sun, petroleum geology, Carter Oil Co., Shreveport, La.

The other 28 Chinese engineers are assigned to a wide variety of industrial firms for training in manufacture and use of machine tools, automotive engines, electric welding, diesel engines, nitrogen products, chemicals, dyestuffs, metallurgy, electrical motors and communication and radio equipment.

BOOK REVIEW

National Emergency Steels. Published by the American Society for Metals, Cleveland, Ohio. 72 pp., 50 cents.

This pamphlet was prepared by the society to aid its numerous War Products Advisory Committees. NE steels were promulgated by the War Production Board in order to use American alloying metals to best advantage and to conserve the scarcer imported metals.



QUESTIONS on TECHNOLOGY

by W. L. Nelson

Cost of Blends to Meet a Gravity Requirement

Can you suggest a simple chart or graph by which we can compute the cost of making a blend of two oils to meet a certain A.P.I. gravity?—I. A. N.

It is presumed that you are interested in blending heavy residual fuel oil with distillate or gas oil to make a higher-value fuel oil.

The general relationship which governs the cost of making such a blend is so complicated that a chart or graphical form of presentation is too complicated to be of service. At least six variables must be related, as:

$$C = \frac{(S_H - S)\,C_L + (S - S_L)C_H}{S_H - S_L}$$

in which

C = Cost to make blend, ct./bbl.
C_L = Cost of light oil, ct./bbl.
C_H = Cost of heavy oil, ct./bbl.
S_H = Sp. gr. of heavy oil.
S_L = Sp. gr. of light oil.
S = Sp. gr. of desired blend.

In case this cost is lower than the current market value of the blend, and it is desired to make such a blend, the percentage of the light oil that will be required is:

$$P_L = \frac{S_H - S}{S_H - S_L}$$

It will be noted that specific gravities rather than A.P.I. gravities are used. The use of A.P.I. gravities would so complicate the relationship that it would be easier to make the computations by arithmetic rather than to use algebraic equations.

As an illustration of the use of the equations, consider the blending of a 9 A.P.I. (1.0071 S.G.) cracked tar with a 35 A.P.I. (0.8498 S.G.) gas oil to make a blend having a gravity of 13 A.P.I. (0.9792 S.G.). The value of the tar, as fuel oil, is 75 cents per barrel and the gas oil is worth $1.26 per barrel. The cost of making the blend is:

$$\text{Cost} = \frac{(1.0071 - 0.9792)126 + (0.9792 - 0.8498)75}{1.0071 - 0.8498}$$

$$= \frac{(0.0279)126 \;\; (0.1294)75}{0.1573}$$

$$= \frac{13.22}{0.1573} = 84 \text{ ct./bbl.}$$

Thus, it would be profitable at present prices of 13 A.P.I. fuel oil to make the blend, to the extent of almost 13 cents per barrel. The amount of gas oil required would be:

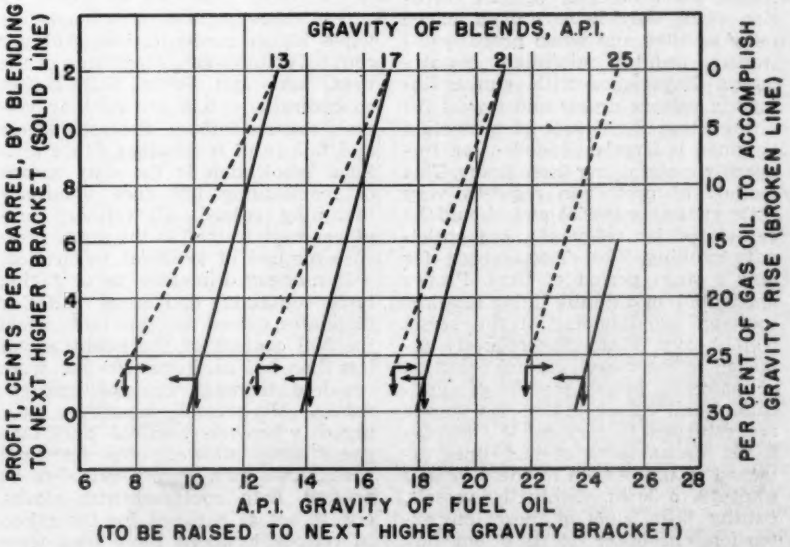
$$\%\text{ gas oil} = \frac{0.0279}{0.1573}\,(100) = 17.7\ \%$$

Obviously, it would be necessary to check such a blend to see that asphaltenes, etc., are not precipitated by the addition of such a large amount of gas oil.

The only way that charts or even tabulations can be prepared for such a complicated relationship is to adopt values for some of the variables. Thus, for a 34 A.P.I. gas oil valued at 3.875 cents per gallon, the profit in making various blends is shown by the figure on this page (continuous lines reading at right and bottom), as well as dotted lines (reading at left and bottom) which indicate the percentage of light oil to be used in the blend. The figure is also based on the current prices of fuel oil established by the U. S. Government of 85, 97, 109, 121, and 127 cents per barrel for 10, 13, 17, 21, and 25 A.P.I. fuel oils.

Illustration.—What is the profit involved in blending a 12 A.P.I. tar to a gravity of 13 A.P.I.? The chart shows a little over 8 cents per barrel (reading from 12 on lower scale up to line marked 13) and the amount of gas oil required in the blend is about 5 per cent (reading from 12 on lower scale up to the dotted line marked 13).

This department was created for the purpose of aiding managers, superintendents, engineers, chemists and all those engaged in the various phases of plant operation; also those connected with the marketing and utilization of petroleum products. Readers are invited to submit their problems to W. L. Nelson, technical editor. Questions should be submitted in as much detail as possible. Inquiries must be signed, but only the given initials will be printed. The source of the question is considered to be confidential. Questions requiring a discussion of patents, extended computations, or a detailed study cannot be considered. When the matter is of general interest, a reply will be published within a reasonable time.



Profit by the blending of residual fuel oils with 34° A.P.I. gas oil (3 7/8 cents per gallon) to produce the next higher price bracket

Handling Sour Crudes

(Continued from Page 28)

cracking stocks from sour crude, the cracking coils were well equipped with corrosion-resistant materials, largely 5 per cent cromoly and KA$_2$S. Therefore, replacements during general inspections were fewer than during the early operation of the pipe stills. The most aggravated corrosion usually occurred on cracking units processing reduced crude. In general, the soaking drums, separators and primary bubble towers were alloy lined. Resistance welded liners proved very satisfactory. Considerable difficulty was experienced with plug welded 11½-13 per cent chrome and corrugated KA$_2$S lines. Generally satisfactory experience was obtained from 3/32-in. and ⅛-in. thick KA$_2$S lines plug-welded on 2-in. and 4-in. centers in these drums. In some cases, fractionating trays in bubble towers were replaced with either 5 per cent or 11½-13 per cent chrome materials.

The following data illustrate the corrosion found on a carbon steel pipe of a cracking coil processing West Texas reduced crude. The 6-in. and 8-in. total feed suction lines made of extra heavy carbon steel were found to have a life of 1 to 2 years. Replacements of some of the fittings in this line were also necessary. The 4-in. and 6-in. total feed discharge lines made of double extra heavy carbon steel were found to have a life of 1 to 3 years. The KA$_2$S coil outlet and soaker release lines and the 5 per cent cromoly vapor lines did not corrode seriously. Tar lines and tar mains fabricated of extra strong carbon steel pipe had a service life of between 6 months and 1 year and were consequently replaced with KA$_2$S pipe.

Sheet metal alloy liners are preferred for protection against corrosion since they have proven to be more positive and when properly installed, require minimum maintenance. Experience with gunite linings in various drums and towers indicated that the degree of protection obtained is largely dependent on frequently maintaining these liners. This method of protection requires very little critical material and should be considered by refineries that anticipate running West Texas crude for only a short period of time. Proper application of a gunite lining requires thorough sandblasting of the vessel wall, heavy reinforcing securely attached to the vessel, careful selection of materials, proper method of application, and curing before the vessels are returned to service. It was also found desirable to extend lines attached to the bottom of these vessels some 18 to 30 in. within the vessels, cutting ⅜-in. slots in these line extensions in order to trap out any lumps of concrete which might drop from the linings.

Because of the obvious possibility of wide variations in the corrosion rates, the need for complete and frequent inspections is readily apparent. At this refinery safety drilling was used extensively on equipment such as pipe stills and cracking coils. This provides an independent check on turnarounds and general inspections.

An additional source of potentially serious trouble was encountered in the rundown tanks. Unless proper precautions are taken, the H$_2$S may form iron sulfide which, in the presence of air, may result in spontaneous ignition. The danger is limited in the main to light distillates and at this refinery they were run to floating-roof tanks where it was possible to eliminate the vapor space. Another precaution was to gunite the shells of floating-roof tanks and the shell and roof members of cone-roof tanks. Where floating-roof tanks are not available and the cone tanks have not been protected by gunite linings, steam has been used to render the gas space inert and to keep roof and members wet. Gunite lining should be maintained in good condition.

Safety Rules

Because of the danger to personnel inherent in handling sour crude, the safety department issued a special booklet of rules for handling both it and distillates. These rules required that all crudes be analyzed for H$_2$S at the point of unloading and if it exceeded 0.05 cu. ft. per 100 gal. the crude was considered dangerous. West Texas crude was considered dangerous regardless of its H$_2$S content. The presence of H$_2$S can be determined either by the use of a piece of filter paper dipped in lead acetate which quickly discolors if H$_2$S is present, or by means of H$_2$S detector which will indicate whether the air is dangerous or safe to work in without protection.

Low concentrations cause headaches while higher concentrations, 0.01 per cent by volume, cause irritation of the eyes, nose and throat. Still higher concentrations, 0.05 per cent by volume, cause dizziness, unconsciousness and failure of respiration. Since artificial respiration is the only means of maintaining life once voluntary breathing ceased, all refinery employes were trained in the prone pressure method of artificial respiration.

Men engaged in sampling or gaging tanks containing dangerous crudes or distillates, except naphtha tanks when the H$_2$S content of the naphtha was less than 0.05 cu. ft. per 100 gal., were required to wear canister-type gas masks. Mechanical measuring was urged wherever possible and tape gages were allowed only for final check. Two men were required to be present, both equipped with masks, one to act as a guard for the other. In remote locations three men were required; one to summon assistance and another to apply artificial respiration in case of need. Gagers were instructed to stand between the wind and the hatch on a platform installed for this purpose. The platform was enclosed with a rail which would prevent an unconscious person from rolling off. Similar measurers were taken with respect to the stairways.

Workmen were not permitted to go to the top of treating tanks when dangerous distillates were being processed and permission was required before going to the top of the agitators adjoining those processing dangerous stocks. Then a gas mask had to be worn. All receiving and pump houses, compressor rooms and other enclosed places were to be well ventilated. Look boxes were securely fastened using gaskets to obtain a gas-tight fit. A slight vacuum was maintained on rundown lines and look boxes and in the event of a failure of the vacuum, all rooms were to be vacated. Before lines or pumps were turned over for major repair they were thoroughly washed with either water or H$_2$S free oil and properly blanked off. The acidulated and alkaline waters from the treating operation were disposed of in separate sewers since there is a possibility of H$_2$S being generated if these two streams are mixed in the same sewer. All sewer inlets were trapped and the traps carefully inspected to insure that the water had not dried out. All sewers carrying H$_2$S contaminated waters were vented and all unused sewer openings plugged.

In addition to these measures, signs were posted at the following locations: Over or at the side of entrances to receiving houses, pump houses and gas houses, in crude-still houses, pump houses, gas houses and at the entrance to stairways to tops of stills, at water drawoff lines, at the bottom of stairways leading to tank tops, on or around agitators and treating plants, on sewer vents when dangerous gases are likely to be present, etc.

In the past, sour crude was received by tank steamer and pipe line. It is anticipated that large quantities will soon be received by tank car which presents a problem to protect the tank-car unloading crews. Appropriate steps must be taken to safeguard this group.

It should also be mentioned that the refinery gas will show hydrogen sulfide content as high as 5 per cent It is obvious that extreme precautions must, therefore, be taken in case of a leak in the gas system or if it is necessary to open the lines.

If this brief review of some of the experiences encountered by one refinery in handling sour crude can be considered typical, it indicates that a large-scale conversion from sweet to sour crudes in refineries not equipped to process the latter will be accompanied by a marked change in equipment, treatment and safety practices in refineries affected.

Octane Number of Catalytic Gasoline Varied by Operating Methods*

by E. V. Murphree,† C. L. Brown,‡ H. G. M. Fischer,¶ E. J. Gohr,¶ and W. J. Sweeney¶

Fluid catalytic cracking produces 45 per cent or more of motor fuel of 80-octane number (Motor method) or 90-92 (Research method); high temperature single-stage cracking gives 80 octane or higher clear by the AFD-1C method, containing aromatics up to more than 85 per cent in the heaviest fraction, which can be leaded (4 cc. TEL) to 97-98-octane number; low temperature aviation fuel operation yields lower octane number product from paraffinic charge stocks but from naphthenic charge stocks the aviation fuel is about equal to that from high temperature operation. High temperature conditions give high yields of olefins and isoparaffins for alkylation, synthetic rubber, etc.

THE basic equipment involved in the Fluid Catalyst operation is illustrated in Fig. 1. This figure, illustrating the application of the process to petroleum cracking, shows the operation divided into two primary zones, one a cracking zone and the other a regeneration zone. The principal apparatus is the same in each zone, consisting of a standpipe, reaction vessel and dust separation means. Referring to Fig. 1, oil vapor is contacted with regenerated catalyst delivered by gravity from a standpipe and the mixture flows in suspension into the cracking reactor where the reaction occurs. The mixture of cracked products and catalyst flow through dust recovery equipment where the catalyst is recovered. The separated spent catalyst is collected in a hopper, and from there flows at high density down a standpipe from which it is injected into a stream of air used for regeneration. This air carries the spent catalyst to the regeneration vessel from which it passes into dust collecting equipment where essentially all the catalyst is removed from the flue gas. The recovered catalyst is collected in a hopper and then flows down through a standpipe from which it is injected into the oil vapor stream, this completing the cycle.

*Condensed slightly from paper presented before American Chemical Society, Detroit, Mich., under the title, "Catalytic Cracking by the Fluid Catalyst Process."

†Standard Oil Development Co.
‡Esso Laboratories, Baton Rouge, La.
¶Esso Laboratories, Elizabeth, N. J.

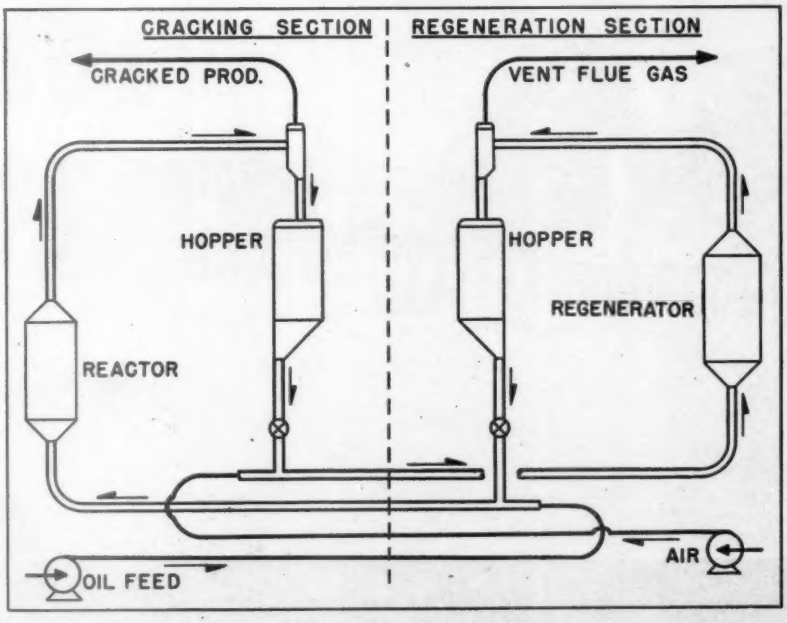


Fig. 1—Catalyst flow in fluid cracking process

Description of Fluid Catalyst Cracking Plant

A simplified flow diagram illustrating the first commercial design of a Fluid Catalyst cracking plant is presented in Fig. 2 to show in more detail the application of the fluid technique to the cracking of oil. More recent designs of Fluid Catalyst units represent definite improvement and simplification over that indicated by Fig. 2. Referring to this diagram, regenerated catalyst from a storage hopper flows by gravity through a standpipe and is injected into the fresh oil feed vapor which carries it to the cracking reactor. The velocity in the reactor is low to maintain a high concentration of catalyst, and cracking occurs with a consequent deposition of carbon on the catalyst. The mixture of cracked products and spent catalyst from the cracking zone are separated in dust recovery equipment, the cracked products flowing to fractionating equipment for separation into desired components. The spent catalyst drops into a storage hopper, flows down a standpipe, is picked up by an undiluted air stream and carried to the regenerator in which removal of carbonaceous deposits is accomplished by combustion. The mixture of flue gas and catalyst from the regenerator are separated, the catalyst dropping into the regenerated catalyst hopper to complete its cycle.

The heat evolved in burning the carbon deposit on the catalyst is greater than can be absorbed as sensible heat by the catalyst for a reasonable temperature rise. It is therefore necessary to have an additional means of absorbing regeneration heat. This is accomplished by circulating regenerated catalyst through shell and tube heat exchangers, using a separate standpipe circuit as shown in Fig. 2. The cooling medium applied to the heat exchangers in the unit described

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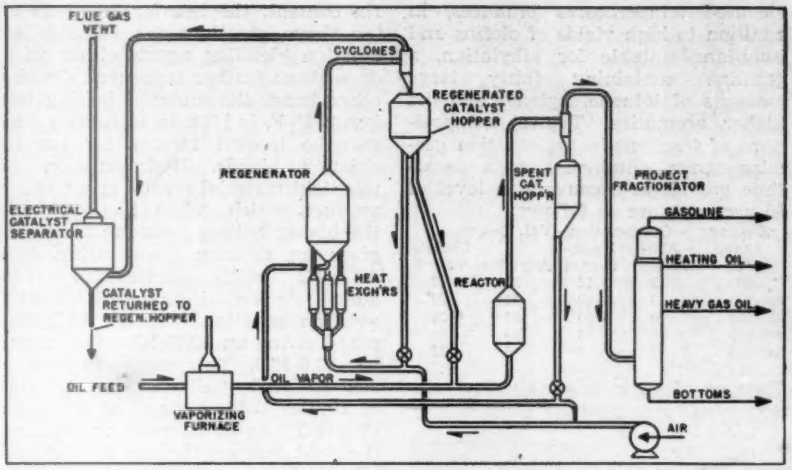

Fig. 2—Fluid catalyst cracking plant

is fresh oil feed to the plant. However, the heat absorbed by this oil is ordinarily more than that required to bring it to proper temperature and a further dissipation of this heat is made to produce steam.

Operation of the fluid cracking plant is entirely automatic. The ratio of catalyst flow to oil flow, for example, is controlled by a mechanism which is actuated by changes in the density of the catalyst-oil mixture. Flow of catalyst to regeneration is insured by automatic control of the level of the catalyst in the spent catalyst hopper. Similarly, temperature of regeneration is governed by automatic regulation of the quantity of catalyst circulated through the heat exchangers.

The flexibility of the fluid process is demonstrated by the fact that operations may be carried out over a wide range of cracking and regeneration temperatures, as well as depth of cracking. Reaction temperatures can be varied both by means of heat applied to the oil in the furnaces and by the amount of hot catalyst circulated. Normal reactor temperatures lie in the range of 800° F. to 1,000° F. The regeneration temperatures can similarly be varied over a relatively wide range, being maintained normally between 1,000° and 1,200° F. The depth of cracking is governed by both the amount of catalyst in the reaction zone and by the ratio of catalyst to oil flow.

The pressure level in the fluid catalyst operation can also be held at any desired point. In most present applications for gas oil cracking the pressure at the top of the reaction vessel is in the order of 10 lb./sq. in. and the pressure at the top of the regeneration vessel substantially atmospheric.

Motor Gasoline Production

Initial work on the Fluid Catalyst process, begun well before the outbreak of the present war, was directed toward the production of high quality motor gasoline. Exploratory work on these operations was carried out on small fluid catalyst pilot units having a capacity of approximately 2 bbl./day of fresh feed. Subsequent development work was conducted in a semicommercial pilot unit with a nominal capacity of 100 bbl./day. Typical results of this work on a variety of feed stocks which are available in the Mid-Continent, Gulf and Eastern Seaboard areas, are presented in Tables 1 and 2. The results obtained on the pilot plants have been substantially checked by three large commercial units which have been put into operation recently.

Production of motor gasoline is normally obtained by contacting distillate stocks with catalyst at moderate temperatures in a single-pass operation. The yield data presented in Table 1 are based on a conversion of about 49 per cent of feed gas oil (100 minus volume per cent cracked gas oil), at which level high yields of specification motor gasolines ranging from 43-46 per cent are obtained from a variety of feed stocks. The conversion of feed gas oil to gasoline and other products can be varied over a wide range, the optimum level being determined by economic factors.

The high quality of the motor fuel is indicated by octane number ratings (Table 2) which range from 91.3 to 94.3 C.F.R. Research ('39) clear. Coastal, or more naphthenic feed stocks, are preferable from the standpoint of octane number and gasoline yield. At some sacrifice in yield, gasolines of higher octane number than shown in Table 2 can be obtained by higher temperature operation.

War Products Operation

Work on the Fluid Cracking process for producing motor gasoline as a primary objective was discontinued some time before the entrance of the United States into the war, and emphasis was placed on the operation to produce war products—in particular, high octane aviation gasoline,

TABLE 1—Motor Gasoline Production, Fluid Catalytic Cracking of Gas Oils

Feed stock—	East Texas wide cut	West Texas wide cut	West Texas heavy	Coastal wide cut
Feed properties:				
Gravity, °A.P.I.	31.7	27.3	22.3	22.1
Aniline point, °F.	180	169	171	180
A.S.T.M.—50%, °F.	680	710	825	781
Sulfur, wt. %	0.48	1.80	2.49	0.63
Product yields:				
Motor gasoline (10 lb. R.v.p., 400° e.p.), vol. %	45.0	43.2	46.0	46.2
Cracked gas oil, vol. %	51.2	51.2	51.2	51.2
Excess butane, vol. %	4.3	3.0	2.0	4.0
Dry gas, wt. %	4.3	6.3	5.6	5.4
Carbon deposit, wt. %	3.1	4.1	3.4	2.6

TABLE 2—Motor Gasoline Quality, Fluid Catalytic Cracking of Gas Oils

Feed stock—	East Texas wide cut	West Texas wide cut	West Texas heavy	Coastal wide cut
Motor gasoline:				
°A.P.I. gravity	60.5	58.2	58.2	57.0
R.v.p., lb./sq. in.	10.0	10.0	10.0	10.0
A.S.T.M. distillation:				
% D + L @ 158° F.	25.5	18.5	18.5	23.0
% D + L @ 212° F.	47.0	42.0	38.0	43.5
F.B.P.	406	400	401	406
Recovery, %	97.5	97.5	97.5	97.0
Aniline Point, °F.	85	76	82	71
Sulfur, wt. %	0.03	0.18	0.246	0.044
Acid heat, ° F.	159	162	186	180
Breakdown, hours	9	14.5	12	10
Octane No.:				
C.F.R.-M. clear	80.5	79.4	77.9	80.5
C.F.R.-M. + 1.55 cc. TEL	84.6	83.0	81.2	84.7
C.F.R.-R. ('39) clear	92.0	91.9	91.3	94.3
C.F.R.-R. ('39) + 1.55 cc. TEL	97.0	95.9	95.3	98.1
Cracked gas oil:				
°A.P.I. gravity	30.0	21.7	22.7	22.0
A.S.T.M.—50%, °F.	572	605	605	563
Aniline point, °F.	144	129	124	96

Note: Inspections on product as produced without further treatment.

raw materials for synthetic rubber, and synthetic toluene. No major revisions in basic equipment or design were necessary to make this change. Through the use of a suitable catalyst and by cracking more severely at higher temperatures, a more desirable product in the aviation gasoline range could be produced, along with increased quantities of the butane fractions required as raw materials for the synthesis of high quality aviation blending components and synthetic rubber.

A. Single Stage High Temperature Operations

Cracking with suitable catalyst at elevated temperatures produces, in addition to high yields of olefins and isobutane suitable for alkylation, a gasoline containing fairly large amounts of toluene, xylenes and the higher aromatics. Typical compositions of fractions in the aviation gasoline range, obtained from a paraffinic gas oil at a conversion level of 65 per cent, are as follows:

Boiling range, °F.—	Composition—Vol. %— Aromatics	Naphthenes	Acyclics	UnSats. vol. %
C_5-200	3	16	81	43
200-225	9	40	51	50
225-250	50	16	25	26
250-335	68	13	19	19
335-350	87	5	8	12

Because of their relatively low olefin content, the heavier fractions of the above gasolines are valuable as aviation blending agents either with or without further treatment. On the other hand, the material boiling below 250° F. is high in olefinicity and may be treated further for use in aviation blends. Hydrogenation of this light material results in a quality product, which, when blended with the higher boiling aromatic fractions, gives an aviation base rating 96.0 AFD-1C with specification lead added. As an alternate, the whole aviation gasoline may be hydrogenated giving an AFD-1C octane number 97.0-98.0. This compares with a 90.6 AFD-1C quality of the material of similar boiling range as produced (Table 3). As an alternate to utilizing the light fraction through hydrogenation, a virgin naphtha can be blended with the heavy cut.

TABLE 3
Product Quality, Single Stage High Temperature Aviation Production
Paraffinic Gas Oil Feed

Aviation stock:	As produced	Blend of hydrog. lt. fraction and raw heavy fraction
Gravity, °A.P.I.	60.2	62.7
R.v.p., lb./sq. in.	7.0	7.0
Aniline point, °F.	66	102
Sulfur, wt. %	0.03	0.03
Bromine No.*	63	8
Acid heat, °F.	135	13
A.S.T.M. distillation:		
I.B.P., °F.	121	110
10%	141	139
50%	190	189
90%	292	288
F.B.P.	338	340
Octane ratings:		
A.S.T.M. clear	80.5	79.1
AFD-1C+4 cc. TEL	90.6	96.0

*Modified Francis method—cg./g.

B. Two Stage Operations

Aviation gasoline of high quality may also be produced by subjecting the material produced in the first stage to a further catalytic treatment, for which the primary cracking plant can be used, if desired. Typical results on the aviation gasoline obtained by such treating are summarized in Table 4.

Increase in product quality from

TABLE 4
Product Quality, Two Stage Aviation Production
Paraffinic Gas Oil Feed

Aviation stock:	Feed	Product
Gravity, °A.P.I.	60.2	56.6
R.v.p., lb./sq. in.	7.0	7.0
Aniline point, °F.	66	64
Sulfur, wt. %	0.03	0.03
Bromine No.	63	13
Acid heat, °F.	135	27
A.S.T.M. distillation:		
I.B.P., °F.	121	108
10%	141	139
50%	190	210
90%	292	293
F.B.P.	338	324
Octane ratings:		
A.S.T.M. clear	80.5	83.1
AFD-1C + 4 cc. TEL	90.6	97.0

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roughly 90 to 97 octane number is obtained partly through the saturation and elimination of the lower boiling olefins, and partly through the concentration of aromatics in the higher boiling fractions. This operation has particular merit in situations where hydrogenation equipment is not available and where the supply of natural light blending naphthas is limited. The aviation gasoline produced is quite aromatic and of hgih quality.

C. Low Temperature Single Stage Operations

Cracking operations with this catalyst may also be carried out at relatively low temperatures to produce an aviation gasoline which may be used directly without further processing in aviation blends. The quality of this material when produced from commonly available paraffinic gas oils is inferior in certain aspects to that produced from higher temperature operations. Leaded AFD-1C octane numbers of 91-94 are normally obtained with 4 cc. TEL. However, certain naphthenic gas oils adapt themselves readily to these cracking conditions and result in a specification product high in leaded octane number (96.0 AFD-1C). Typical products from this type operation are presented in Table 5. An inherent disadvantage to cracking at these conditions lies in the low qualities of olefins made available for the production of aviation alkylate.

TABLE 5

Product Quality, Single-Pass Low-Temperature Aviation Production

	Feed stock type	
Aviation product:	Naphthenic	Paraffinic
Gravity, °A.P.I.	57.6	67.7
R.v.p., lb./sq. in.	7.0	7.0
Aniline point, °F.	85	122
Sulfur, wt. %	0.014	0.01
Bromine No.	10	20
Acid heat, °F.	24	39
A.S.T.M. distillation:		
I.B.P., °F.	114	114
10%	140	141
50%	203	189
90%	273	274
F.B.P.	300	316
Octane ratings:		
A.S.T.M. clear	81.6	77.9
AFD-1C+4cc TEL	96.0	93.3

Although a number of methods of utilizing Fluid Catalyst cracking for the production of high quality aviation base have been discussed, there are other methods of application which may be attractive to certain locations. It should be emphasized, moreover, that the Fluid Cracking process is not solely a producer of aviation base, but does also simultaneously produce raw material for alkylation. A typical illustration of the manner in which this process fits into the production of 100-octane aviation gasoline is outlined in Fig. 3. Assuming that 100 bbl. of paraffinic heavy gas oil are fed to a fluid catalyst unit, it is possible to produce 78.4 bbl. of 100-octane aviation fuel meeting present specifications. Extraneous quantities of isobutane are utilized in this integrated operation due to the fact that the isobutane produced in the catalytic unit is not sufficient to alkylate all the C_3 and C_4 olefins produced. Sufficient isobutane is available, however, to alkylate substantially all the butylenes. Since the blend of aviation-gasoline constituents from the catalytic operation is higher in octane number than specifications require, readily available light virgin naphthas can be utilized to increase gasoline volume while still meeting specifications. In addition to the aviation product, the following byproducts are produced:

Fuel gas, M.c.f.	38.8
Motor fuel cut, bbl.	6.6
Heating oil cut, bbl.	23.0

Commercial Operations

The present commercial experience with large Fluid Catalyst plants has been very gratifying. The first unit was placed in operation on May 25, 1942, with surprisingly little difficulty. Initial operations were conducted for motor gasoline on heavy wide cut gas oils since the catalyst required for the war products operation was not available. Smooth performance has been obtained: yields, product quality and operating conditions were found to be in good agreement with the semicommercial pilot plant, as shown in Table 6.

The recovery of catalyst has been satisfactory in general, despite periods in which high losses were experienced because of faulty mechanical conditions in the dust collecting equipment. Over the 5 months' period of operation referred to above, actual catalyst loss averaged 2.27 tons per day, or about 0.41 lb./bbl. of feed. This figure includes somewhat high losses in the starting up of the unit, which will be preventable in the future. Small mechanical changes are being made in the dust collecting system to insure dependability of operation, and it is expected that with these changes catalyst loss from a large commercial Fluid Catalyst unit will be near 1 ton per day.

TABLE 6

Comparison of Commercial vs. Pilot Cracking

Motor Gasoline Operation—Paraffinic Gas Oil

	Plant	
Yields on feed:	Commercial	Pilot
10 lb. R.v.p. gasoline, vol. %	42.8	45.6
Excess butane, vol. %	7.3	4.8
Gasoline + butane, vol. %	50.1	50.4
Gas oil, vol. %	50.0	50.0
Dry gas, wt. %	5.8	4.4
Carbon, wt. %	2.5	3.2
Motor gasoline quality:		
A.P.I. gravity	60.3	60.4
I.B.P., °F.	101	95
% at 122	5.5	6.0
% at 158	22.5	24.0
% at 212	45.0	46.0
% at 257	64.0	61.5
% at 356	92.5	90.0
F.B.P., °F.	385	400
Color	+20	+20
Aniline point, °F.	85	87
Sulfur, %	0.03	0.04
Bromine No.	66	75
Octane ratings:		
A.S.T.M. clear	79.2	79.7
C.F.R.-R. ('39) clear + 1.5 cc. TEL	92.9	92.0

General

The Fluid Catalyst process represents a contribution of the Standard Oil Development Co. to a cooperative study on catalytic refining participated in by the refining organizations of the Standard Oil Co. (N. J.) and by:

Anglo Iranian Oil Co.
M. W. Kellogg Co.
Shell Oil Co.
Standard Oil Co. (Indiana).
The Texas Co.
Universal Oil Products Co.

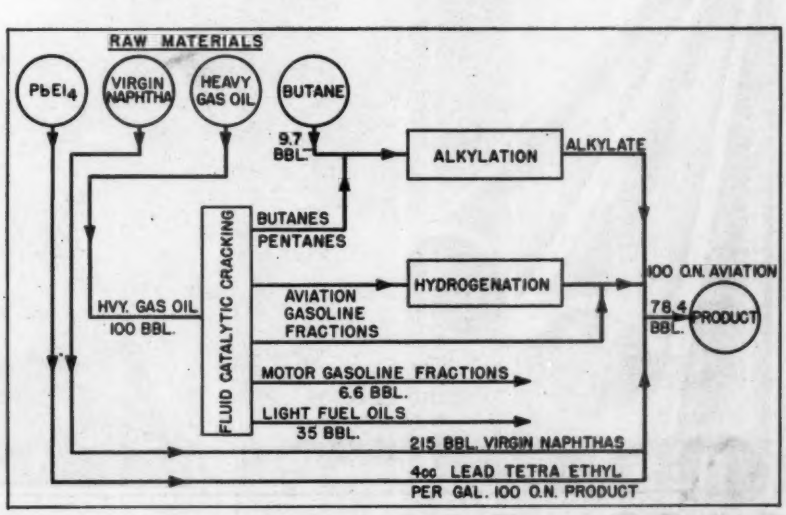

Fig. 3—Aviation-gasoline production by fluid catalytic cracking

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COST COMPARISON—TWO LIFTING METHODS

Problem. — The production from case well No. 1 is now being lifted by means of equipment which shall be referred to as **present method.** A radically different method designated as **proposed method,** is to be considered. Compare the estimated future profit to be realized from each method.

Pertinent Operating Data

	Bbl./day
Present oil production	60
Present water production	765
Total fluid	825
Per cent oil in fluid	7.3
Maximum well capacity based on fluid level	2,700
Fluid increase possible present method	None
Fluid capacity—proposed	1,850
Oil production—proposed	130

The increase in production, which serves as an indicator, ordinarily justifies further investigation. The estimation of reserves and economic limits, therefore, must be considered in order to evaluate the indicator.

Reserves

Present method.—The estimated reserves have been set at 85,310 bbl. The economic life is 8 years, and this is based upon an economic limit of 10 bbl. of oil per day.

Proposed method.—Under this method of operation, at a daily fluid-producing rate of 1,850 bbl. per day, the 85,310 bbl. of estimated reserves should be exhausted in 3¾ years. This would be down to a daily production of 22 bbl. of oil. However, since the proposed method handles greater fluid production, the well may be produced economically to a lower percentage of oil in total fluid — in other words, to an economic limit of 13.5 bbl. per day. This lower economic limit should permit the recovery of approximately 5,730 bbl. of additional reserves. This adds 1 year to the previously estimated life, making a total of 4¾ years.

Fig. 1 shows the method of estimating the reserves under both methods of operation. These figures are based upon past performance of the well. This indicated that a decline rate of approximately 20 per cent per year might reasonably be expected during the remaining life.

Economics

The next step in logical order should be a comparison in cost between the two different methods, as shown in Table 1.

Obviously the accuracy of a cost-engineering problem of this kind is dependent upon the calculation of reserves. And also upon the quality of cost data available on the present method of operation, and the accuracy of the estimate involving future operating costs of the proposed method.

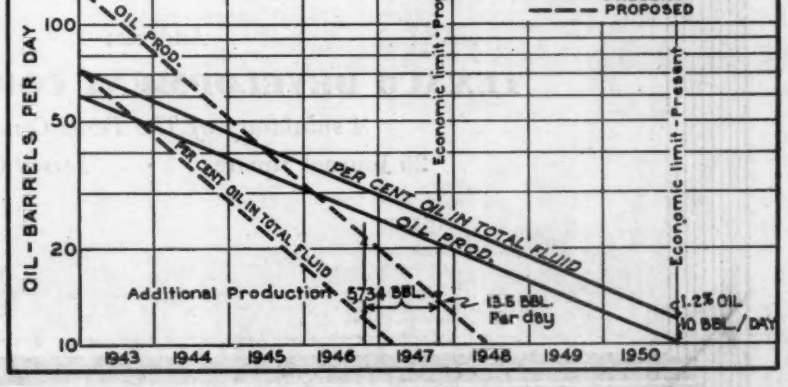
It should be pointed out that cost-engineering problems of this kind might be solved in favor of the proposed method by one engineer and in favor of the present method by another engineer, both working independently. This, of course, is due to the many variables. The evaluation of these may depend largely upon opinion or judgment. For this reason an engineer should submit two, or even three methods of calculating a problem and then make his recommendation. This will permit the executives to inject financial factors which the engineer is not always expected to know about. In the calculation of the problem shown, for example, there has been no interest charge made on the cash outlay involving $11,300.

TABLE 1

Future Profit—Present Method		
Value net oil produced		$82,107
Est. total operating ex. for 8 years	$18,720	
Gross production tax	4,105	
		22,825
Net profit oil prod.		$59,282
Value salvable equip.		2,370
Total future profit		$61,652
Present worth*		51,659
Investment Loss—Proposed Method		
Est. total installation cost	$11,300	
Salvage value of equip.	7,892	
Total investment loss	$3,408	
Future Profit—Proposed Method		
Value net oil produced		$87,629
Est. total operating ex. for 4¾ years	$15,675	
Gross production tax	4,381	
Investment loss	3,408	
Total cost		$23,464
Net profit oil prod.		$64,165
Present worth*		57,061
Est. increased profit favoring proposed method		5,402

*5 per cent compounded annually.

FIG. 1.
CASE NO. 1.
RESERVES - ESTIMATED FUTURE OIL PRODUCTION.
PRESENT
PROPOSED



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SUBSURFACE PRESSURE GAGES

D—Stupakoff Gage

THE Stupakoff gage is illustrated in Fig. 4. The primary pressure element consists of a corrugated tube forming a bellows to which pressure is applied externally causing it to shorten its length. Shortening of the bellows is opposed by a spring attached to the closed end of the bellows. In this way the shortening of the bellows is proportional to the applied pressure. A shaft, direct connected to the inside of the bellows, carries a stylus which records pressure variations on a clock-revolved chart.

The well fluid enters the gage through the inlet port (44), and the pressure tends to compress the secondary bellows (41). The secondary bellows provides separation between the well fluid and the operating fluid of the gage, thus preventing corrosion of other inner parts of the gage. The outside of the secondary bellows is protected from corrosion by a baked coating of bakelite on its surface. The upper end of the primary bellows is attached to a rigid sealed header, while the lower end is attached inside to a shaft which extends upward through bellows and carries stylus.

The space around the primary bellows is filled with a special heat-resisting noncorrosive mineral-seal oil which transmits the pressure from the secondary to the primary bellows.

The barrel of the gage has an outside diameter of 1¾ in. and is made in sections with wrench flats for dismantling.

A maximum recording thermometer is provided in a housing at the upper end of the gage for obtaining the temperature at which pressure measurements are taken.

The recording unit fits into the recording housing (7). It consists of three main parts: a clock, a gear box, and a drum assembly. The drum is rotated by the clock through the gear box. The speed of chart rotation may be changed by changing gears in the gear box. The clock will run 8 days with one winding.

The manufacturer of this gage is now developing a new type of clock which is mounted directly on the bellows shaft and rotates the stylus.

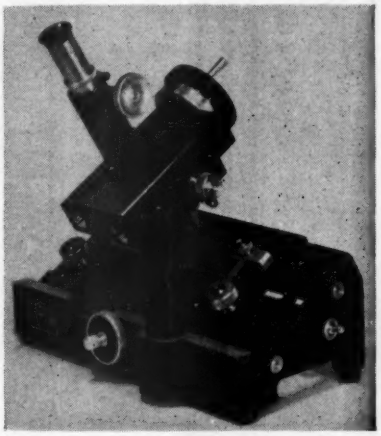


Fig. 5

It is expected that this will represent quite an improvement by making possible a larger chart without increasing the diameter of the gage and by reducing machining costs through simplification of the chart drum bearings.

Cylindrical metallic charts of highly polished aluminum are used for securing the pressure record in the recording drum. These charts are marked by the stylus point which is tipped with tungsten carbide and ground to a very fine point.

The manufacturer supplies a special chart reading microscope which permits scaling of a chart to 1/10,000 in. The microscope is shown in Fig. 5.

Pressure measurements to an accuracy of 0.2 per cent are claimed for this gage. To obtain this accuracy the manufacturer recommends the use of an especially designed deadweight tester and a thermostatically controlled heater jacket for use in calibration operations. The recommended calibration procedure is essentially the same as that given in Installment 86 of this series.

E—Bureau of Mines Gage

THE Bureau of Mines Multiple-Diaphragm Recording Subsurface-Pressure Gage is illustrated in Fig. 6.* This represents the third gage designed, built, and used by engineers of the Bureau of Mines. The two earlier models were quite different

*Reproduced from U. S. Bureau of Mines Report of Investigation 3291.

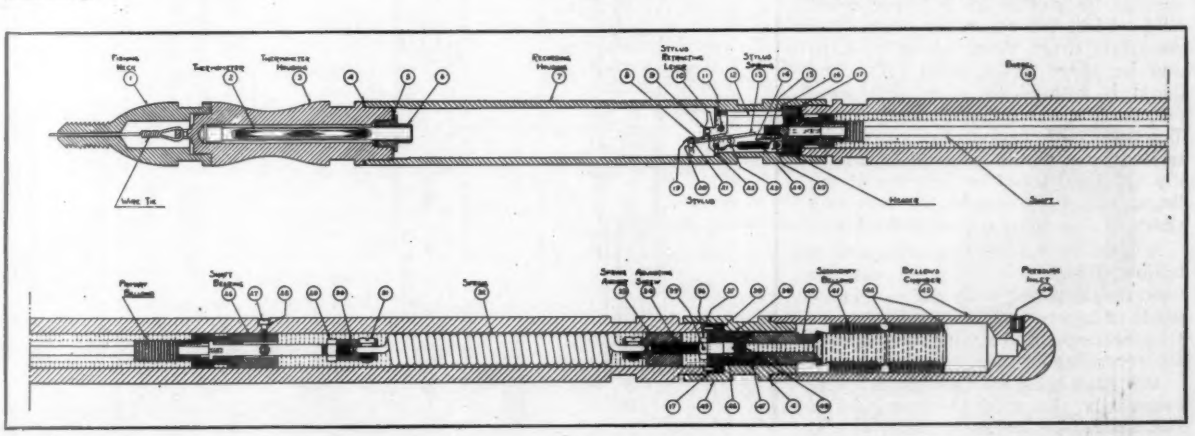


Fig. 4

Series prepared by Glenn M. Stearns, associate professor of petroleum engineering, University of Oklahoma

in design from the one shown in Fig. 6 and will not be discussed here.

The gage illustrated may be divided into four major parts, namely: pressure element, multiplying mechanism, recording mechanism, housing.

The pressure element is composed of 25 steel bellows, made of S.A.E. 6150 chrome-vanadium steel, and placed end to end within a heavy steel case (8). Fig. 6-C shows a detail of the diaphragms. There are three of the diaphragms (at the two ends and in the middle) which are made with a slightly greater outside diameter than the others so as to act as bearing points to hold the bellows series straight within the tube (8).

Screen-covered ports are provided near the bottom (1) of the gage to allow well fluid pressure to be communicated into the space on the outside of a bronze bellows (5). The bronze bellows (5) and the steel bellows (11, 12, 13) are filled with a special noncorrosive oil. Well pressures are transmitted through the bronze bellows to the oil inside the steel diaphragms of the pressure element. The pressure inside the steel diaphragms causes each of them to expand. The cumulative effect of such pressure is an appreciable upward movement of the upper end of the diaphragm series, such movement being proportional to the pressure inside the pressure element.

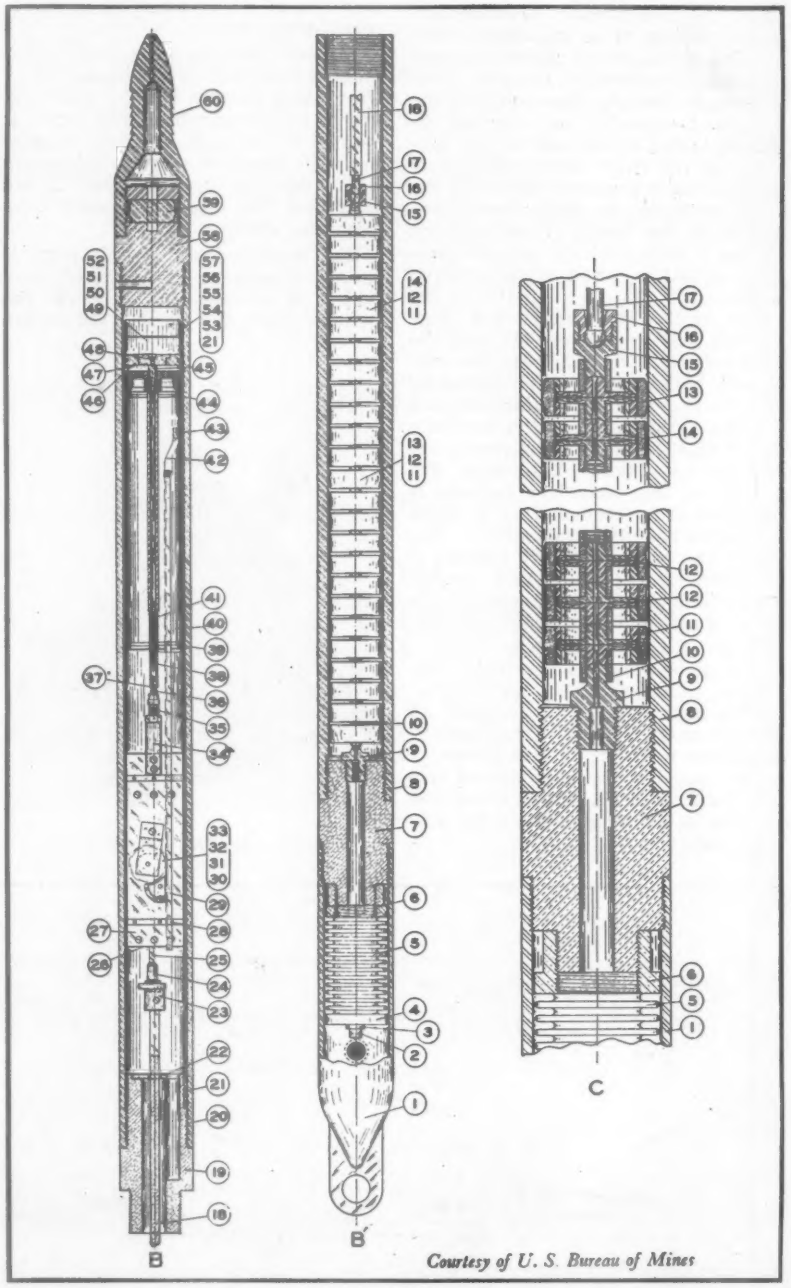
The element is so built that with an increase in pressure from zero to 2,000 lb. per sq. in. inside it the cumulative travel of the 25 bellows amounts to about 0.65 in. In order to make a larger chart for convenience and accuracy in reading, a multiplying mechanism (26-34) is incorporated in the gage, which causes the recording stylus to move about seven times as far as the upper end of the pressure element.

The stylus (42) is attached to the upper end of the gear rack (29), and records its motion on a paper chart held within the recording drum. The recording drum revolves on a sharp and hardened pivot point (37). The drum is rotated by a coiled spring (41) wound around the drum shaft. The speed of drum rotation is controlled by a watch movement assembly (48-51). Speed of rotation of the drum can be changed by changing gears in the timing gear assembly.

A glass-tube recording pen with a hollow platinum-wire point can be used for recording with ink on a chart made of heavy profile drawing paper. Or a brass-pointed stylus may be used for recording on sensitized paper.

The gage must be calibrated, using essentially the method described in Installment 86, before a chart record can be used to obtain accurate pressure readings. For finely accurate results, calibration curves must be obtained for both increasing and decreasing pressures and at the temperature at which well readings are to be taken. The difference in the calibration curves for increasing and decreasing pressure amount to a greater per cent of the total pressure reading at lower pressures, and thus neglecting such difference in this range would result in a larger error in a pressure determination. Differences in calibration curves due to continued use of the instrument are negligible.

Note: This discussion is a condensation of information given by W. B. Berwald, H. A. Buss, and C. E. Reistle, Jr., in R.I. 3291 of the U. S. Bureau of Mines entitled "Bureau of Mines Multiple-Diaphragm Recording Subsurface-Pressure Gage" and published in November 1935. Their report gives a description of the gage in greater detail, even including a dimensioned drawing of each component part.

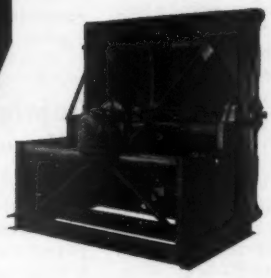


Courtesy of U. S. Bureau of Mines

Fig. 6

Young
Units for Refinery Applications ★ ★ ★

YOUNG *Quad Atmospheric* Cooling and Condensing Towers for large capacity vapor and gasoline and vapor mixture condensing; engine and compressor jacket water and lube oil cooling, and for gas cooling.



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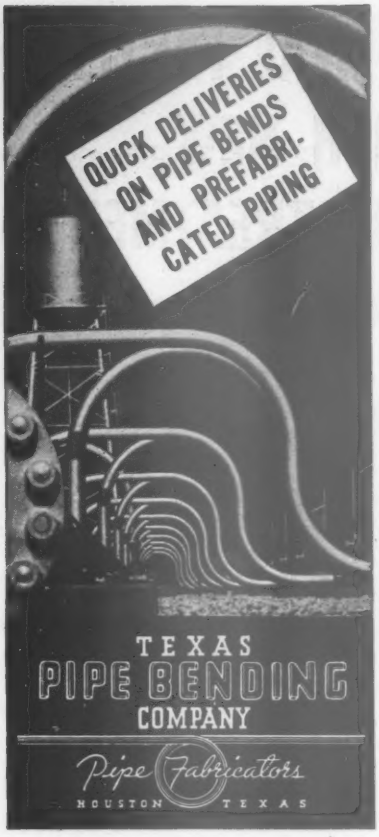

REFINING

Charles H. Alberding Made District 2 Refining Chief

WASHINGTON, D. C. — Appointment of Charles H. Alberding as director of refining for District 2 of the Petroleum Administration for War, was announced from Washington last week by Deputy Petroleum Administrator Ralph K. Davies.

In commenting on the appointment, Mr. Davies termed it "fortunate that Mr. Alberding, with his 20 years of experience in the petroleum industry, is available to assume this assignment."

In 1927, Mr. Alberding left the Imperial Refining Co., in the Mid-Continent area to become connected with Universal Oil Products Co., in Chicago.

In May 1931, he was given charge of the service and operating divisions for Universal Oil Products, from which position he was given leave of absence in September 1942, to become connected with the Civilian Supply Division of the War Production Board in Washington, D. C.

In March 1943, he became connected with the Refining Division of the Petroleum Administration for War in Washington.

He attended Cornell University, graduating with a bachelor of science degree, in mechanical engineering.

Isopropyl Alcohol Rules Relaxed as Supply Rises

WASHINGTON, D. C. — Allocation procedure governing isopropyl alcohol has been simplified, thus reducing paper work by industry and the War Production Board, through issuance of

Sketches of Plant Operators

FREDERICK, Md., neighbors remember him as George Frederick Ordeman who was christened by his parents with the name of his home town as his middle name. The oil industry knows him today, however, as Dr. G. F. Ordeman, a new assistant general superintendent of Standard Oil Co. of Indiana's Whiting, Ind., refinery.

Dr. Ordeman was graduated with two degrees from Washington and Lee University, a bachelor of science in engineering in 1912 and a bachelor of science in chemistry a year later. After receiving his Ph.D. in chemistry at Johns Hopkins University he returned to Washington and Lee as associate professor of chemistry in 1916. He entered the first World War the next year and was a first lieutenant for 2 years.

Dr. Ordeman became a research chemist at the Whiting refinery of Standard of Indiana in 1919. He became assistant superintendent of the asphalt and acid department in 1923 and for the next 20 years was in the light-oils department as head of the finishing division, head of the crude-still division, head of the pressure-still division and superintendent. He was promoted to assistant general superintendent of the Whiting refinery February 1, 1943.

Dr. Ordeman is chairman of the board of stewards of the First Methodist Church of Whiting and a past superintendent of the church school. He is also a past president of the Standard Oil Athletic Association and the Foreman's Fellowship Club at the refinery and a past chairman of the Whiting chapter of the American Red Cross. He is a member of the Chamber of Commerce of Whiting and also of East Chicago. Dr. Ordeman is married and has a married daughter.

General Preference Order M-168 as amended, effective June 1.

The amended order provides for the use of Form PD-602 by a supplier (producer or distributor) seeking authorization to make delivery of or to use isopropyl alcohol. The supplier must submit to WPB the use information obtained from customers. The order previously required use of Forms PD-600 and PD-601.

Specifications Changed on 91-Octane Motor Fuel

DAYTON, Ohio.—Alternate methods of testing knock rating of 91-octane aviation gasoline and changes in lead and inhibitor specifications have been adopted by the Army and Navy. The revisions are contained in Specification AN-F-26 which supersedes AN-VV-F-776. Revisions became effective April 15 but were released for publication only last week.

The lean mixture knock rating of the fuel, determined in accordance with Specification AN-VV-F-746, shall be not less than 91-octane number. The knock rating of not less than 90-octane number by method A.S.T.M. D357-41T will be accepted as equivalent to a rating of not less than 91-octane number by method AN-VV-F-746. The rich mixture knock rating of the fuel, determined in accordance with Specification AN-VV-F-748, shall not be less than 96-octane number. The rich mixture knock rating of the fuel shall be determined at the fuel-air ratio at which the maximum indicated mean effective pressure for the lower bracket reference fuel is obtained.

The fuel may contain tetraethyl lead in the form of 1-T Ethyl Aviation Fluid in concentration not exceeding 4 ml. per U. S. gallon. Previously, this specification called for 1.5-T Mix Ethyl Fluid. The following inhibitors in the ratio of 1 lb., excluding solvent, per 5,000 gal. of fuel, are specified: isobutyl - para - aminophenol, normal butyl-para-aminophenol and N,N' di-butyl-para-phenylenediamine.

Specifications on determining knock rating were changed to read: The lean mixture rating of the sample shall be determined by the method given in Specification AN-VV-F-746 or alternatively by Method 600.12 of Federal Specilifation VV-L-791b (A.S.T.M. D357-41T) and the rich mixture knock rating of the sample shall be determined by the method given in Specification AN-VV-F-748.

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Asphalt Specifications Changed in Directive 66

WASHINGTON, D. C.—A change in the specification for certain road asphalt has been made by Petroleum Administration for War at the request of the Public Roads Administration through an amendment to Petroleum Directive 66.

The change is made in the penetration-range specification of residue from distillation for MC-1 cutback asphalt to a new standard of 200-350 instead of the old range of 120-300. It was explained that production of slow-curing road oils had been eliminated and MC-1 cutback asphalt was substituted, and the new specification gives a softer base to improve penetration of the road surface.

Gasoline Yield Declines to Lowest "Modern" Level

WASHINGTON, D. C.—The lowest yield of gasoline in the "modern" history of the refining industry was reported in the March summary of petroleum operations released last week by the Bureau of Mines. Gasoline recovery for the entire country in March averaged 35.8 per cent on crude charged to stills, the bureau reported, compared to 36.7 per cent in February and to 41.8 per cent in March 1942.

Yields of fuel products also declined. Kerosene recovery decreased to 5.6 per cent in March; distillate fuel oil declined to 15.4 per cent, a drop of 0.5 per cent, and residual fuel-oil output averaged 29.2 per cent on crude, compared to 30.2 per cent in February.

Total demand for motor fuel in March was about 45,000,000 bbl., or about 16 per cent below a year ago. The gain in gasoline stocks during March was about 1,200,000 bbl., which is considerably below normal because of the drastic cut in motor-fuel yields.

New Management to Expand Alberta Plant's Capacity

LETHBRIDGE, Alta.—Capacity of the refinery here previously owned by Huff Refinery Co., Ltd., is to be increased to 1,200 bbl. daily, according to plans of the new owner, Pacific Oil & Refinery Co. of Alberta, Ltd. Current capacity of the skimming plant is 500 bbl. daily.

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Natural Gas

Panhandle Eastern and Ohio Gas Rate Case Reset

WASHINGTON, D. C.—The Federal Power Commission announced last week its orders (1) postponing to 9:45 a.m., June 16, the hearing previously set for May 26 on a disagreement as to the rate proposed by the Panhandle Eastern Pipe Line Co. of Kansas City, Mo., for natural gas sold to Ohio Fuel Gas Co., Columbus, Ohio, for resale pursuant to Directive 1, dated July 25, 1942, issued by the War Production Board under its Limitation Order L-31; (2) consolidating for the purpose of hearing this proceeding with one arising from a disagreement as to the rate charged by Panhandle for natural gas sold Ohio Fuel Gas for resale pursuant to Directive 10, dated March 30, 1943, also issued by the WPB under Limitation Order L-31, and (3) setting hearing on the latter proceeding simultaneously with the former. The hearings will be held in Washington, D. C.

Hugoton Market Expanded By Projected 26-in. Line

WASHINGTON, D. C.—A new outlet for a maximum of 140,000,000 cu. ft. of natural gas daily will be established for the Hugoton field in Oklahoma and Kansas by construction of the 26-in. line to Blackwell, Okla., approved last week by the War Production Board. The 26-in. line for which WPB granted priorities will run from the center of Texas County, Oklahoma, 240 miles eastward to the Cities Service system's connection at Blackwell, Okla.

Cities Service will build the line, as it is the principal natural-gas distributor in the area and the one most in need of additional supplies. Neighboring utilities, however, are assured of the opportunity to obtain deliveries from the line to assist in meeting any possible deficiencies during the war period and for a year thereafter.

Construction of the new pipe line is necessary, declared J. A. Krug, director of the Office of War Utilities, because of the vast increase in war manufacturing in the area with a consequent increase in consumption and the decline in output of a number of fields upon which Cities Service has depended heretofore.

Gas delivered through the new line will replace that formerly drawn from the West Cement field, Oklahoma. Gas withdrawals from the West Cement field were banned May 18 to protect petroleum production recently discovered on the structure.

An estimated 55,000 tons of steel will be required to complete the line, which should be ready for operation in December of this year. This is the largest of the three natural-gas pipe lines approved by the OWU this year. The others are a 120-mile line from a connection south of Toledo, Ohio, to a point south of Cleveland, designed to relieve deficiencies in the Appalachian area, and looping of the Panhandle-Eastern line which runs from the Hugoton field to Detroit.

High-Speed Heating With Gas to Be Investigated

NEW YORK.—Investigation and development of the possibilities inherent in heating steel and other materials with gas at speeds heretofore unattainable is the subject of a new research project authorized by the executive board of the American Gas Association.

Preliminary work in laboratories and in a number of mass-production factories indicates that gas has great possibilities in the field of high speed, direct heating. Enthusiasts think this will be the next great movement in industrial gas heating, comparable with the introduction of mechanical furnaces, circulating-air heaters and radiant-tube heating.

The general objectives of the project have been set forth as follows: To establish the effects of high-speed, direct heating with modern gas-air combustion on the metallurgical, working and production properties of ferrous and nonferrous metals (both standard and NE types) as heated for forging, normalizing, annealing, hardening, drawing, rolling, extruding, etc. To compare these effects with the corresponding effects of conventional furnace heating and of other methods of high-speed heating such as electric induction and oxyacetylene—and to study their relative merits.

The project has been assigned to the engineering laboratories of the Selas Co., Philadelphia, Pa. Details are being handled by a subcommittee composed of J. P. Leinroth, Charles C. Krausse, Charles R. Bellamy, F. W. Marklin, and Eugene D. Milener. Work on the project will begin immediately.

Colorado Interstate to Seek Expansion Permit

WASHINGTON, D. C.—Hearing on an application filed by the Colorado Interstate Gas Co., New York, for a certificate of public convenience and necessity under Section 7 of the Natural Gas Act, as amended, authorizing construction and operation of a 6-in. pipe line, and a 560-hp. compressor station will be held here June 8 by the Federal Power Commission. The pipe line will connect with existing facilities of the company, the order says.

Natural Gasoline

Michigan Concern Plans $1,000,000 Unit at Reed City

SAGINAW, Mich. — Approval has been given by the Michigan Public Service Commission to the first attempt of importance to use casinghead gas for commercial purposes. The West Michigan Consumers Co. plans to spend nearly $1,000,000 in providing facilities to use about 10,000,000 cu. ft. of gas daily, drawing from wells in the Reed City pool.

Gilbert T. Shilson, commission chairman, said the plan is for the company to use about 3,500,000 cu. ft. of the daily take for its present industrial customers and the remainder for refineries in the Muskegon area which now use oil as a fuel. In the process, he added, the company hopes to produce about 13,000 gal. of gasoline daily, in addition to substantial amounts of butane and propane. If any surplus gas results, the plan is to experiment with storing it underground in the old Muskegon oil field.

Mr. Shilson explained the company proposes to move a small plant near Grand Rapids in the Wyoming and Waverly oil area to the Reed City field, Michigan's biggest. It will require a 60-mile pipe line connecting with the 170 wells in the Reed City pool. Plant expansion, it was said, will cost $503,000, the pipe line $480,000. The hope is to begin the processing by early fall.

During the hearing on the petition, Lee S. Miller, Conservation Department geologist, declared the loss of gas from Michigan oil wells is 25,000,000 cu. ft. a day, a fuel equivalent to about 1,000 tons of coal. Mr. Miller estimated the Reed City field gas reserve at more than 22 billion cubic feet.

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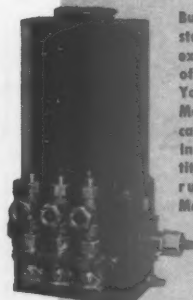

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PIPE LINES

WEP Shipments Impeded by Damage From Floods

Floods continued to interfere with the movement of crude from the Norris City, Ill., terminal of War Emergency Pipelines, Inc., early this week. Because of water over railroad tracks, traffic had to be diverted over circuitous routes. While a temporary line was being laid to restore movement across the Arkansas River where the main line was broken, tank cars were dispersed to bring oil eastward from southwestern points. These are being returned to the WEP pool. On a day at the beginning of this week 446 cars carrying about 94,000 bbl. were loaded at Norris City, Ill. Shipments to the Ohio Pipe Line at Enfield, Ill., for transshipment to tank cars from loading racks on the system rose on the same day to the high figure of 72,000 bbl.; total shipments were 166,000 bbl.

B. E. Hull, vice president and general manager, WEP, was commended in a telegram from Petroleum Administrator Harold L. Ickes, congratulating him "upon the completion in record breaking time" of the 8 miles of 20-in. for the temporary line at 9 p.m. May 24, 6 days and 21 hours after the 24-in. line across the Arkansas River broke. Mr. Ickes commended highly the tireless efforts of Mr. Hull, "Vice President A. N. Horne, Chief Engineer Oscar Wolfe, General Superintendent Oscar Burden and the pipe-line crews who were on the job."

Much of the credit for the job is being given to the aggressiveness and resourcefulness of Oscar Burden and to the cooperation of the Rock Island Railroad.

As soon as the flood subsides the 24-in. line will be repaired and lowered by dredging to a depth which will be safe in case the river changes its course again. Dredging will be done for a distance of 4,500 ft. from the river bank.

Although pipe shipments by railroad for the 20-in. products line went as far astray as Omaha, Neb., and Kansas City, Mo., due to interruptions and embargoes during the flood period, construction work was not interrupted by lack of pipe. A gang of Sheehan Pipe Line Construction Co. was marooned early this week in the Wabash River. Most of the gangs are getting out of the mud and back on the job.

For the eastward extension of the big-inch crude line, 578 miles had been laid at the beginning of this week, consisting of 481 miles of 24-in. and 97 miles of 20-in. For the refined products line 76 miles had been laid.

All tanks were full the last few days at Longview, Tex., and Norris City, Ill. As soon as normal conditions are restored, possibly this week, a batch of West Texas crude will be moved through the 24-in. line.

Cities Service Subsidiary To Build Hugoton Outlet

Steps were taken last week to clear up certain details preliminary to building the 240-mile 26-in. natural-gas pipe line from the Hugoton field to the Cities Service Gas Co. system at Blackwell, Okla. Cities Service Transportation & Chemical Co. will build the new transmission line which will require 55,000 tons of steel. The preference rating certificate was given to this Cities Service subsidiary by WPB.

Cities Service Transportation & Chemical Co. is said to be "four corporations removed from Cities Service Gas Co." Clay Briggs, chief engineer, Cities Service Oil Co., Bartlesville, Okla., is serving as agent for the new subsidiary. It is reported that an office for the organization will be opened at Ponca City, Okla. Stations will be equipped with units totaling 8,000 hp. Dehydration equipment will be installed.

Albany-Boston Line Would Double Fuel Deliveries

The interest of the Boston Chamber of Commerce in the proposed 165-mile heating-oil pipe line consisting of 10-in. from the vicinity of Albany, N. Y., to West Boylston, Mass., and 8-in. from there to Boston Harbor has been explained by W. H. Day, manager, transportation department.

"Starting from the premise that additional tank cars cannot be obtained under existing conditions," he says, "it stands to reason that the only hope for a larger movement via rail routes lies in improving the performance of such cars as are available. If under existing operating schedules, it requires 18 days to bring a car from Texas fields to New England, un-

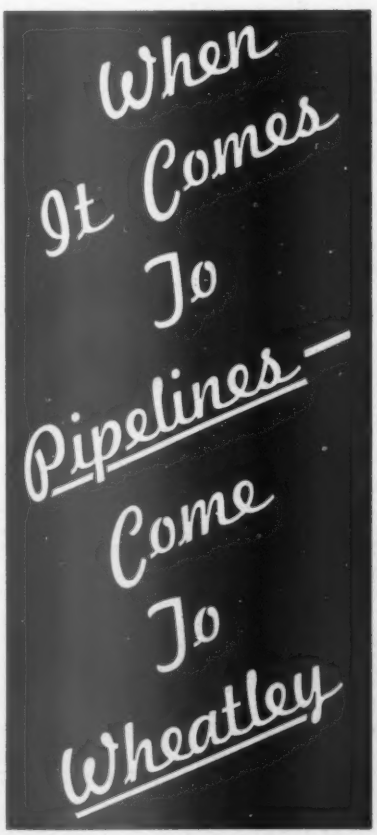
load and return to originating points, it stands to reason that if this turnaround time can be cut in half, one car will be bringing as much oil to New England as two under present conditions."

If instead of bringing cars into New England, they could be unloaded at the Hudson River for forwarding by pipe line, there would be a large saving in the turnaround of each car. Additional saving in tank cars would be effected by taking advantage of large movements of liquid fuels from the Great Lakes through the New York Barge Canal and Hudson River, during periods of open navigation.

The length of the Albany-Boston line may be reduced from 165 to 125 miles by making use of existing refined products lines such as Socony-Vacuum Oil Co., Inc.'s system connecting Providence, R. I., with Hartford, Conn., via Worcester and Springfield, Mass., and Shell Oil Co., Inc.'s system delivering from Fall River to West Boylston and Waltham, Mass.

Wisconsin Governor Gets Bill Impeding Pipe Lines

MADISON, Wis.—The 1943 Wisconsin Legislature has passed and sent to Gov. Walter Goodland for signature a second bill impeding introduction of natural gas into the state.



By a vote of 24 to 4, the senate adopted a measure imposing an excise tax of 7 cents per 1,000 cu. ft. on all natural gas used in the state except that consumed by the state, its political subdivisions or the federal Government.

The assembly previously had passed the same bill, 67 to 14.

The legislature previously enacted a measure requiring the consent of the local governing body before natural gas can be introduced into any Wisconsin city.

Floods Cut Eastward Movements One-Fifth

WASHINGTON, D. C.—Widespread disruption of transportation by floods in the Midwest and Southwest will shrink the movement of oil to the eastern seaboard by at least a fifth and may, for a few days, cut that traffic nearly in half, the Office of Defense Transportation said last week.

ODT officials made it clear that the impact of the disastrous floods has not yet been apparent in deliveries of oil to the East. The April movement was nearly 18 per cent greater than in January, and deliveries so far this month have been even higher.

However, they indicated that the effects will be felt in the East starting immediately and will continue to be apparent to some degree for a considerable period.

Washouts of rail facilities and the break in the big-inch line will result in a temporary loss to the East of at least 1,000 tank cars of oil a day, more than a fifth of the total rail movement to the region.

In addition to these losses, even after the flood waters subside time lost for repairs of roadbeds, bridges, and the 24-in. Texas-to-Illinois pipe line will cost the East at least 600 tank cars a day—approximately 125,000 bbl.—for 1 to 2 weeks.

Floods Break Several Pipe-Line River Crossings

For a period of at least 3 days crude-oil movement through three pipe-line systems crossing the Mississippi, in addition to the big inch were reduced by 158,000 bbl. daily. While repairs are being made as rapidly as possible, some of the lines are still out and others moving less than capacity quantities of oil.

Considerable trouble was experienced near St. Charles, Mo., when the Missouri River overflowed and cut a new channel into the Mississippi. That flood washed out a 10-in. line of the Ajax Pipe Line Co. which extends from Jenks, Okla., to Wood River, Ill., and the next day the second 10-in. of the company went out.

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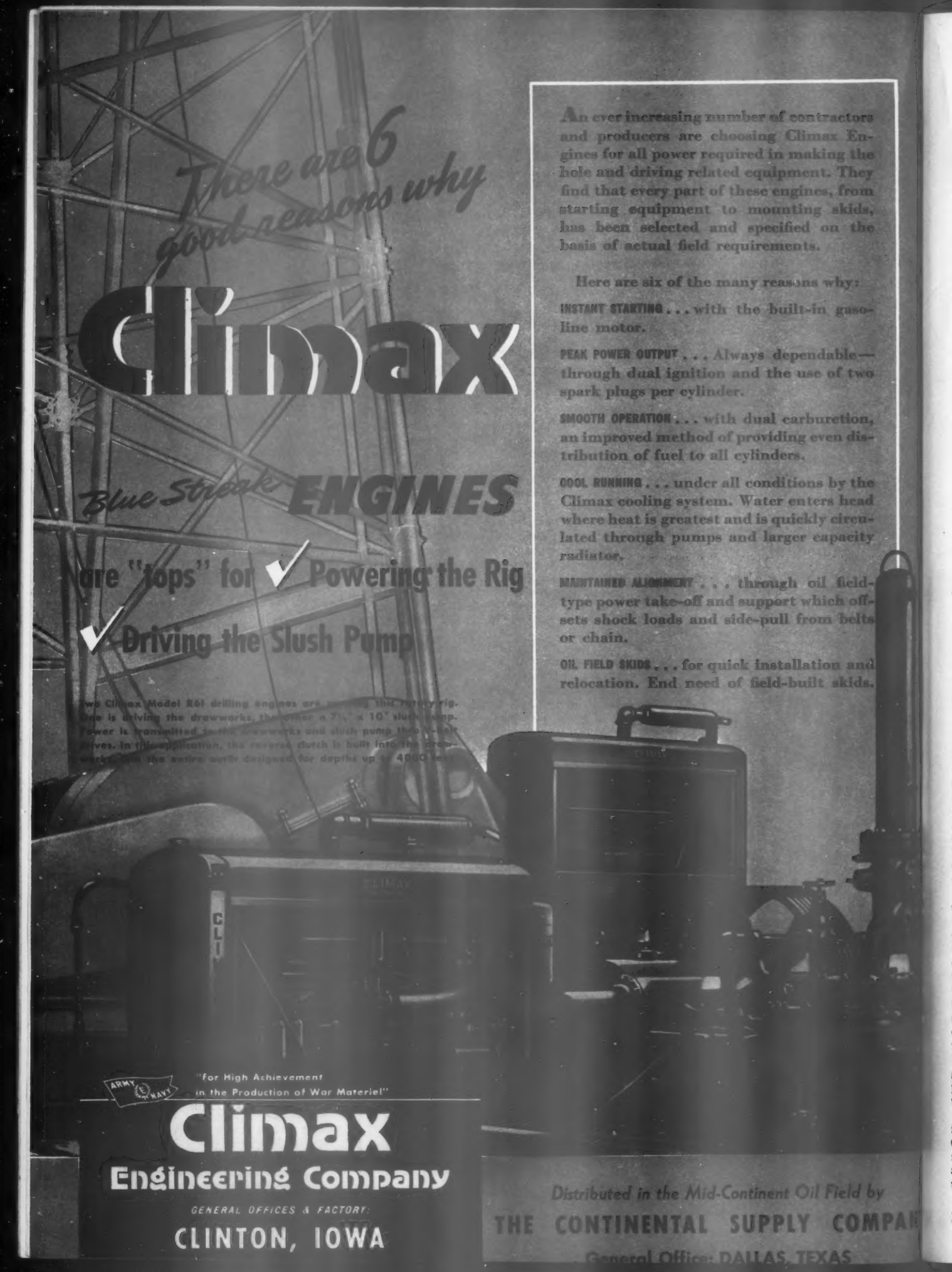
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Exploration and Drilling

Week's Highlights

THERE is a growing opinion that the United States has reached its peak in oil production. During the past 30 years, many individuals have made the same statement, only to be confounded by a series of major discoveries which have pushed the nation's reserves to ever higher levels. There is always the chance that history will repeat itself again.

Since 1938, discoveries of new oil have not equaled withdrawals, in any single year, although there is a very good chance that 1943 will see enough new Ellenburger oil in West Texas to provide an excess. This may even be repeated by additional deep discoveries under Ector County, or Wasson or Slaughter or in New Mexico.

Tacitly, PAW has admitted by reducing spacing requirements that it does not expect important discoveries in several areas, the Appalachian fields, the Illinois basin, Oklahoma, eastern Kansas, North Central Texas and California. An increasing number of oil companies are turning their attention to foreign fields, despite the growing difficulty of operating in other countries. The Bureau of Mines is devoting more attention to possible substitutes for naturally occurring liquid petroleum. The Interstate Compact Commission, the A.I.M.E., the A.A.P.G., and the A.P.I. are now giving an increasing proportion of their programs to secondary recovery. These signs all point in the same direction.

How does the independent operator stand in all of this? For most of them, foreign concessions are out of the question. The manufacture of synthetic petroleums from shale oil or coal is a combination of mining and refining so that there is little opportunity for the independent producer in those fields. However, declining reserves do not mean a cessation of discoveries and there is still plenty of room for the independent producer. Posibly, his fortunes are on the upgrade and will improve greatly in the postwar restoration of economic laws to oil production.

Discoveries are gradually diminishing in average size. At present, 3,000,000 bbl. is a liberal estimate for the reserves found in the average field and the size of that field is from 300 to 600 acres. The larger companies are not as much interested in entering a highly competitive picture for that kind of production as they are in finding large blocks with commensurately large reserves. The independent who thinks of 40's and 160's rather than 5,000-acre blocks has no preference for a 40 in a 10,000-acre field rather than in a 300-acre field, provided he can produce and sell his oil. In fact he is often better off in the small field.

It is quite possible that the major companies will withdraw from large areas leaving them all to the independent. In those districts there will be consulting geologists with a large fund of information, often gathered at the expense of the major companies, which they will use in finding small but paying properties. It is improbable that there will be many Sinclairs, Phillips or Continentals growing out of these operations but there never were many, even in the good old days. To compensate for the inability to run a shoestring into a major company, there may also be fewer bankruptcies.

SOUTHWEST TEXAS: Wilcox production has been established in the old shallow Slick pool in Goliad County. A large gas-distillate discovery well is reported in Jim Wells County (p. 72).

WEST TEXAS: A south outpost to the Fullerton field, Andrews County, extended the field 1 mile south and established a potential record for the field (p. 73).

COMPLETIONS IN ALL FIELDS . . .

(Week Ended May 29, 1943)

	Oil	Gas	Dry	Total	Footage	Total comp. to date 1943	1942
N. Y., Penn., W. Va.	51	16	2	69	133,701	1,298	1,459
Ohio	2	10	14	26	70,279	317	387
Indiana	2	0	1	3	5,971	97	131
Kentucky	5	0	3	8	18,956	131	91
Illinois	14	0	10	24	61,639	696	613
Michigan	5	1	11	17	50,335	178	263
Kansas	20	0	21	41	141,429	608	581
Nebraska	0	0	0	0	0	11	18
Missouri-Iowa	0	0	1	1	1,502	5	9
Oklahoma	7	0	8	15	55,361	432	543
Texas:							
North Central Texas	12	0	11	23	78,595	488	511
West Texas	11	0	4	15	66,678	340	726
Texas Panhandle	4	1	0	5	15,492	71	185
Eastern Texas	2	1	3	6	28,397	103	177
Texas Gulf Coast	6	0	5	11	76,455	159	352
Southwest Texas	7	2	11	20	99,933	344	556
Total Texas	42	4	34	80	385,550	1,505	2,507
North Louisiana	1	2	3	6	23,994	122	200
Louisiana Gulf Coast	8	0	3	11	103,678	137	221
Total Louisiana	9	2	6	17	127,672	259	421
Arkansas	5	0	2	7	27,927	95	61
Mississippi and Southeast	0	0	0	0	0	26	25
Montana	4	0	1	5	10,805	70	60
Wyoming	2	0	0	2	6,990	48	38
Colorado, Utah	0	0	0	0	0	5	4
New Mexico	7	0	1	8	24,769	87	106
California	13	0	3	16	44,098	485	326
Total United States	189	33	118	339	1,146,984	6,353	7,643
Total previous week	174	34	111	319			
Week ended May 30, 1942	182	33	96	311			

Classification of Sedimentary Rocks Related to Kind of Oil Reservoir

by W. V. Howard

This is the second of a series of articles on sedimentary rocks as oil reservoirs. The next article deals with secondary processes which change their porosity and permeability.

SINCE there is almost an infinite variety of sedimentary rocks, it is necessary to group them into readily identifiable classes for general reference. Two sandstones, for example, might have enough different characteristics to require several pages of description to identify them completely, yet for all practical purposes they are simply sandstones and use of this term will give any experienced geologist a fair conception of their essential properties. Adding a single word, describing the color, will give still more information. Another adjective, denoting the impurities, such as "shaly" or "calcareous" would seem to provide still more information but, actually, every additional qualifying term creates more difficulty. The result of attempting to describe a sediment in a few words is that geologists find that there are so many variations that logs prepared by two men are generally hard to correlate. Many experienced petrographers find that their standards change gradually so that they cannot correlate two wells which they, themselves, have logged and which were drilled 2 years apart.

Also the terms used by geologists are also used by drillers, although not necessarily in the same sense so that more confusion results.

Genetic Classification Needed

From the standpoint of correlation of beds, a classification based on the obvious physical characteristics of sediments may be adequate, provided it is based on standardized descriptive terms. If, however, it is desired to go beyond merely labeling the layers of rock encountered by the drill, that is to use our knowledge of the sedimentary section for the location, development and production of oil fields, other types of classification are necessary. It may be said definitely that no classification is of value unless it is genetic. That is, a mere pigeon-holing of rock types is far inferior to a classification which involves the environment in which they were deposited and the forces which combined to give them their present characteristics. This is where the trouble starts.

In the first place, there are two types of process recognizable in most sedimentary rocks, those which resulted in the original deposition of the sediment and those which altered the original sediment until it reached its present condition. The first group are called "primary" and the others are "secondary."

The primary processes include transportation by some moving fluid, generally water but sometimes air or ice (which may be considered as a very viscous fluid). During transportation there is a certain amount of sorting as the moving fluid may have a velocity sufficient to carry fine material but not coarse. The next step is deposition. All of these processes are dependent on changes in the velocity of the fluid surrounding the rock fragments. If in a certain locality the velocity of the current remains constant, material of the same size and weight will continue to be deposited so long as it is provided. For example, a thick sand without bedding planes or variations in size of grain indicates constant conditions of deposition over a long period of time, together with a constant supply of material.

Thus, the material deposited in any environment depends on conditions within the environment and also on conditions in the area from which material is transported into that environment. With this in mind, a classification which covers both the environment of deposition and that of origin of the material would be a good start on a genetic classification of materials. Several have been suggested of which two may be discussed. The first of these was suggested by Van der Gracht and the second has been recently called to the attention of geologists by Paul D. Krynine. Both are based upon the amount of uplift that has taken place in the neighboring land areas but differ in that Van der Gracht relates the deposits to the site of deposition while Krynine bases his classification on the place of origin of the material which is eventually deposited to form the sediments. Fortunately, except for minor differences the two methods lead to the same conclusion since a flat coastal plain is generally bordered by a shallow sea with a broad continental shelf and a steep or rugged shore line by an irregular sea floor. Both systems encounter a mental hazard in the minds of American geologists because they make use of "foreign terms." This objection does not appear valid when we consider that such terms as "Ordovician," "dolomite," and "Heterostegina" are commonly used.

Flysch and Molasse

In addition to the normal sediments deposited in shallow seas bordering coastal plains areas, Van der Gracht refers to "flysch" and "molasse." Flysch deposits are laid down in a geosyncline directly previous to the major elevation of the neighboring land. The basin of deposition may range from shallow to deep and the environment from marine to continental. The sediments tend to range from fine clastics below to coarse clastics above. As an example of flysch deposits, the late Mississippian and early Pennsylvanian around the Ouachitas in Arkansas and Oklahoma may be considered typical.

Krynine has not yet published his final report, but in preliminary discussions and outlines he classifies his rock types on the basis of the medium-grained material, generally referred to by geologists as sandstones. What may be considered the normal type is called "quartzose" or "quartzitic." These are "clean" sands and are formed following prolonged chemical decay in peneplained areas or by the reworking of previously deposited quartzose sediments.

The second type are known as "greywackes" which are "dirty" sandstones containing an abundance of slate, shale and chert fragments, micas and other relatively unstable minerals indicating fairly rapid derivation from an uplifted land mass which has been worn down to the level at which mildly metamorphosed rocks occur. The third type, the "arkoses," are also "dirty" sands in which feldspars are

common constituents. As the mountains are worn down further, erosion and deposition are less rapid and chemical action becomes more important, resulting in the formation of such materials as granite wash. Krynine considers molasses as occurring in the greywacke group.

There is thus some overlapping in the two classifications, due to the different bases on which they are founded.

From the standpoint of the oil geologist, Van der Gracht's classification appears to be of greater significance. Oil reservoirs are containers of oil not generators so that their mineralogical composition has little bearing on their oil content. It does, however, have a profound bearing in the physical characteristics of the reservoir.

The difficulty of assigning specific rock types to a definite stage in diastrophic processes may be demonstrated easily. The Piedmont area of the eastern United States is largely underlain by granite. An uplift of about 1,000 ft. would result in the deposition of arkosic sediments. The same elevation of the Ouachita Mountains would not. In other words, the nature of the terrane which is uplifted has as much to do with the sediments deposited as the amount of uplift. However, the fact remains that, regardless of the degree of oversimplification, Krynine's concepts can be used in exploring for oil and are of great importance in the process of producing the oil when found.

The three classes of clastic sediments may be described as follows:

Normal (quartzose) sediments: Derived from relatively flat-lying land masses in which erosion is slow and is accompanied by intense chemical decay. The sediments tend to be uniform in texture and composition over long distances, the sandstones being clean highly quartzose rocks with stable minerals in association, that is, calcite, dolomite, tourmaline, zircon, etc. Limestones and dolomites make up considerable portions of the section. Shales are largely clay shales. Being largely blanket deposits, the sands produce on structure but wedge-edges are rare. Individual limestone formations may have been uplifted over wide areas and eroded so that reservoirs associated with certain series such as the Viola, Hunton, Mississippi lime and Kansas City-Lansing are widespread.

The sands, being clean, tend to have relatively uniform porosity and permeability so that high recoveries during the primary cycle of production may be expected except in the case of dissolved-gas drive.

Flysch sediments: Formed in basins which may eventually contain several thousand feet of sediments (geosynclines) as a result of relatively rapid erosion of an uplifted land area. The land mass may be underlain by sedimentary rocks which have been partially altered by the action of heat and pressure. The erosion of the uplifted area may provide material faster than it can be accommodated in the subsiding basin with the result that there is a mixture of marine and continental deposits, often associated with coal. Variation of sediments within short distances is the general rule with numerous wedge-edges, lensing sands, buried sand bars and other forms of stratigraphic traps. The sands tend to be dirty with rock fragments, mica flakes and relatively unstable minerals accompanying the quartz (greywackes). Limestones are rarer than in the case of the normal types of sediment and are generally thin and do not extend over wide areas. The correlation of individual beds is difficult as the same conditions, even of animal life, may be found at nearly the same level in different parts of the basin, resulting in correlations which later work may prove incorrect. The finer deposits tend to be finer-grained greywackes rather than clay-shales. Production on structure is frequent but stratigraphic traps assume much greater importance than in the normal-type sediments.

The sand may have high porosities and saturation but because of the heterogeneous nature of the accompanying minerals and their irregular size and shape, permeabilities are irregular. Because of the limited extent of the reservoirs, water-drive and gas-cap-drive fields tend to be rarer than in the blanket-type deposits although they may exist. Secondary recovery methods are, therefore, more common and more successful in the flysch-type deposits than in the normal deposits.

Molasse sediments: These may be of two general types, depending on whether or not the mountain system being eroded was denuded to granite. If it is, the molasse will be arkosic. If not, it will be a sedimentary molasse. Molasse deposits, being derived as the result of rapid erosion of steep slopes and being deposited mainly in foredeeps, which are deep depressions in the sea floor, are poorly sorted and poorly weathered. This results in thick deposits with poor bedding planes and containing unstable, easily decomposed minerals. The irregular sorting leads to low vertical permeabilities as in the case of the flysch, although there may be high permeabilities parallel to the bedding planes. As the basin fills, the sediments tend to get finer. In many cases the basin fills completely to above sea level and the marine molasse gives place to continental molasse or alluvial deposits similar to the Tertiary of the Great Plains. Because of rapid erosion and deposition of materials, limestones are practically absent in the section. Because of the presence of feldspar, some of the beds are red and may be confused with other red beds which are of continental origin.

Since there is no sharp dividing line between flysch and molasse deposits many deposits classified as molasse (or arkosic) may carry oil. Krynine places the East Indian and California fields in this category. These are mainly in the finer molasse and the sands tend to be thick. Stratigraphic traps are common and oil has been found in molasses of continental origin. As practically all of the molasse beds which produce are of Tertiary age, the oil which they contain tends to be heavy and viscous. The irregular permeability prevents high recoveries per acre-foot but redrilling of molasse areas in California today is resulting in surprisingly good wells in areas thought to be nearly depleted. Less attention has been paid to secondary recovery than

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DAILY AVERAGE PRODUCTION FOR WEEK

	May 29 crude oil	May PAW quota all oils	May 22 crude oil
Arkansas	72,900	73,000	72,600
California	762,250	822,700	780,325
Colorado	6,475	7,400	6,700
Eastern fields	102,600	115,700	101,950
Illinois	219,650	250,800	210,500
Indiana	14,200	16,000	13,200
Kansas	299,450	309,700	311,650
Louisiana	348,000	359,300	348,200
North Louisiana	*87,000*	.....	*87,200*
Louisiana Gulf Coast	*261,000*	.....	*261,000*
Michigan	58,100	62,100	57,900
Mississippi	54,000	50,000	58,300
Montana	21,450	24,600	20,275
Nebraska	2,100	2,400	2,100
New Mexico	97,850	105,700	101,000
Oklahoma	323,250	379,000	318,700
Texas	1,502,500	1,562,000	1,502,400
East Texas	*339,300*	.....	*339,300*
West Texas	*226,700*	.....	*226,750*
North Central Texas	*131,750*	.....	*131,750*
East Central Texas	*124,300*	.....	*124,300*
Texas Panhandle	*91,200*	.....	*91,100*
Texas Gulf Coast	*514,000*	.....	*513,950*
Southwest Texas	*75,250*	.....	*75,250*
Wyoming	97,240	97,000	92,900
Total United States	3,982,015	4,237,400	3,996,700
Total production Jan. 1-May 29, 1943			582,110,465 bbl.
Same period last year			568,594,065 bbl.

SOUTHWEST TEXAS

Shallow Area Gets Second Pay in Deep Wilcox Sand

CORPUS CHRISTI, Tex. — Wilcox sand production has been established in the old shallow Slick area of Goliad County with completion by Continental Oil Co. of 1 Alva S. Woods estate in the C.E.P.I.R.R. & Mfg. Co. Survey. Initial production was 249 bbl. of 36-gravity oil daily through ⅞-in. choke from perforations at 7,600-20 ft. Tubing pressure was 1,075 lb. and casing pressure 1,425 lb. Total depth is 8,003 ft. The South Texas Geological Society has named the field Slick (Wilcox). Sun Oil Co. 1 Gena Heard, Goliad County wildcat 2 miles southeast of Weesatche, a wildcat test, was drilling in hard shale at 6,988 ft.

Jim Wells County.—The wildcat test, 1-A Maria S. de Garza, drilled by Sam E. Wilson, Jr., and D. Auld, 2¾ miles east of La Gloria, has been completed with an open-flow potential of 100,000,000 cu. ft. of gas and 150 bbl. of distillate daily from perforations at 7,920-27 ft. Total depth is 8,211 ft., plugged back to 7,936 ft. The well was killed with heavy mud and shut in. The South Texas Geological Society has named the discovery the Wilson field. Humble Oil & Refining was coring at 5,654 ft. in sand at its 1 M. A. Evetts, 2 miles north of Magnolia City. Kilgore Developers and Butcher-Arthur were at 4,150 ft. in shale at 1 W. W. West et al, a mile southeast of Sandia.

Starr County.—Lockhart & Davenport 1 First National Bank of Mission, 10 miles north of Rio Grande City, was flowing into tanks this week, the second producer in the recently opened Lockhart field. It was reported making an estimated 300 bbl. daily from pay at 3,580-3,600 ft. The well is 1,320 ft. south of the discovery, 1 Caffarelli. Baldridge & King 1 Francisco Rodriguez, about 3½ miles southeast of the Lockhart field, has been completed dry, after failing to show for production at 1,225 ft. This test was 660 ft. south of the same operators' discovery in the Frio sand, 1 Mary Edgerton. The Edgerton has been shut in after testing 18 bbl. of oil and 82 bbl. of salt water daily on the pump. Locations have been staked for two more shallow wildcats. Hagan & Stewart will drill 1 G. Ramos et al, in the A.B.&M. Survey. Judge Brothers will drill 1 Z. Salinas, in the Zacatosa grant.

Live Oak County.—Henderson Coquat made a drill-stem test of 1 W. W. Gobel, 2 miles east of Oakville, from perforations at 6,908-35 ft., with ¼-in. chokes at top and bottom and with 1,800-ft. water cushion. It recovered the water cushion, 30 ft. of distillate and 100 ft. of mud. Operator then cored to 6,980 ft., finding sand and shale streaks, with distillate odor in spots. As the week closed, the crew was reaming core hole to make a drill-stem test. Smith & Story have staked location for a wildcat test, 1 S. S. Dunn, 5 miles southeast of Oakville. Fidelity Oil & Royalty Co. spudded 3 Reeves Brown, wildcat 3 miles east of the Mount Lucas field.

Atascosa County.—Humble 1 Coward, 1½ miles southwest of the discovery well of the Imogene field, is reported to have recovered 300 ft. of 39-gravity oil on a 40-minute drill-stem test at 7,636-46 ft. and ran casing on bottom at 7,646 ft. A drill-stem test at 7,638 ft. showed an estimated production of 30,000,000 cu. ft. of gas daily.

SOUTH TEXAS COMPLETIONS

Wildcats

Duval County: Transwestern 32 D.C.R.C. Sur. 302, 2 mi. N Casa Blanca field, dry at 2,626 ft.

La Salle County: Progress Petroleum Co. 1 Marie Zuehl, 2½ mi. W of Washburn field, dry at 5,723 ft.

Live Oak County: Hickok & Reynolds 1 Alamo Lumber Co., 4½ mi. NE of Sunniland, dry at 3,517 ft.

Starr County: Baldridge & King 1 Francisco Rodriguez, 7 mi. N of Rio Grande City, dry at 1,225 ft.

Fields

Cadena, Duval County: Taylor Refining Co. 2-B Genaro Garcia, Blackstone Hardeman Sur., dry at 6,516 ft., P.B. 5,178 ft.

Colorado, Jim Hogg County: Sun 20 N. S. Thaxton, 108 bbl. on 12-hr. gage through

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CORRECTION

In our advertisement in the May 27, 1943 issue of The Oil and Gas Journal, page 72, the statement is made that "Jerguson is the originator and developer of the reflex-gage in this country. In fact, all reflex gages of today are made under Jerguson licensed arrangement." Part of this statement is incorrect and we take this opportunity to make an immediate correction.

Not all reflex gages are made under Jerguson licensed arrangement as stated, but some manufacturers are licensed by us to construct reflex gages: "With bolts entirely embracing the chambers of the gage thus greatly strengthening the entire assembly."

We greatly regret that this error occurred in our original advertisement and that we were unable to correct it before that particular form had been printed. We take this opportunity, however, of correcting the erroneous statement as quickly as possible.

JERGUSON GAGE & VALVE CO.

85 Fellsway **Somerville, Mass.**

PERMIAN BASIN

Fullerton Extension Is Record Flowing Well

MIDLAND, Tex.—Fullerton Oil Co. 1-A University, ½-mile south extension to the Fullerton pool of northwest Andrews County, which last week drilled to water at 7,280 ft., established a new potential record for the pool when it flowed at the rate of 2,125 bbl. per day. The pay section from 6,773 to 7,243 ft. was treated with a total of 16,000 gal. of acid. Location of the new well is C NE NE Section 6, Block 13, University Survey. East of the Emma pool, Skelly Oil Co. 1-K University, in Section 28, Block 9, University Survey, was drilling at 7,250 ft. with no further shows reported.

Pecos County.—A new shallow pool for Pecos was indicated last week at Choate & Brown 1-15 University, NW NW Section 15, Block 20, University Survey, west of the Taylor-Link pool, which bailed from 10 to 15 bbl. oil per day after setting 5½-in. casing at 1,327 ft. Drilling was continued as the hole was still bottomed in sand. There was about 25,000 cu. ft. gas coming with the oil. Deepest drilling test in West Texas was making hole below 11,320 ft. in black shale. It is Phillips Petroleum Co. 1 Ada Price, Section 11, Block 101, T.C.R.R. Survey, 27 miles southeast of Fort Stockton.

Winkler County.—Stanolind-Shell 1 Blue, prospective Ellenburger producer in eastern part of the county, indicated sulfur in cores taken from 10,642-52 ft., of which the bottom 2 feet were brown dolomite with slight fractures. The next core from 10,652-62 ft. shows 3 ft. fine dolomitic lime, and coring was resumed.

Howard County.—W. S. Guthrie 1 Pauline Allen, discovery in northeast part of the county, on acidization attempt with 2,000 gal., would take but 500 gal., after which it flowed and pumped 169 bbl. in 22 hours, with no water showing.

Crockett County.—Rapid development for the Olson pool was seen when Plymouth Oil Co., recent purchasers of the four wells and acreage around them, announced immediate drilling of seven wells in the area.

WEST TEXAS COMPLETIONS

Wildcats

Howard County: Ray Oil 1 Louie Hutto, SE SE Sec. 46, Blk. 31-1n, T.&P. R.R. Sur., elev. 2,421 ft., dry, T.D. 2,942 ft.

Mitchell County: Cosden Pet. and W. D. Casebolt 1 Charles J. Thompson, NE NE Sec. 53, Blk. 25, T.&P.R.R. Sur., dry, T.D. 3,948 ft.

Yoakum County: Humble Oil & Ref. 1 Tannehill Bros., SW NE Sec. 840, Blk. D, J. H. Gibson Sur., dry, T.D. 7,950 ft.

Fields

Apco-Warner, Pecos County: General Crude Oil 1 V. G. Crockett, 750 ft. from W, 3,506 ft. from S, Sec. 5, Blk. 110, T.C.R.R. Sur., elev. 2,464 ft., flow 2,164 bbl., pay 4,650 ft., perf. 4,650-4,750 ft., T.D. 4,764 ft.

Goldsmith, Ector County: Continental Oil 2-B Kloh et al, 330 ft. from N, 1,650 ft. from E, Sec. 31, Blk. 45-1n, T.&P.R.R. Sur., elev. 3,265 ft., flow 216 bbl., acid 10,000 gal., T.D. 4,310 ft.

Fullerton, Andrews County: Fullerton Oil 1-A University, NE NE Sec. 6, Blk. 13, University Sur., flow 2,125 bbl., pay 6,776 ft., acid 16,000 gal., P.B. to 7,243 ft. from T.D. 7,287 ft.

Mascho, Andrews County: Seaboard Oil 5 M. A. Thornberry, NE SW Sec. 18, Blk. A-42, Public School Land, elev. 3,218 ft., flow 441 bbl., lime pay 4,240 ft., shot 870 qt., T.D. 4,620 ft.

Shipley, Ward County: Stanolind Oil & Gas 1 Ruth Kaufman, 2,154 ft. from NE, 330 ft. from NW, Sec. 3, Blk. 5, H.&T.C. R.R. Sur., elev. 2,495 ft., I.P. 83 bbl., pay 2,470 ft., T.D. 2,486 ft.

Slaughter, Cochran County: T. D. Humphrey 2 C. S. Dean, 1,973 ft. from N, 708 ft. from E, 525-ac. tract, Lge. 91, Lipscomb County School Land, elev. 3,685 ft., flow 580 bbl., pay lime 5,014 ft., T.D. 5,056 ft.

T. D. Humphrey 4 C. S. Dean, 629 ft. from N, 2,125 ft. from E, 525-ac. tract, Lge. 91, Lipscomb County School Land, elev. 3,710 ft., flow 569 bbl., pay lime 5,018 ft., acid 12,000 gal., T.D. 5,061 ft.

Slaughter, Hockley County: J. C. Hawkins 36-A Mallett, 580 ft. from S and W Lab. 19, Lge. 47, Edwards County School Land, flow 604 bbl., lime pay 4,936 ft., acid 11,500 gal., T.D. 4,980 ft.

T. F. Morrow 33 Mallett, 580 ft. from S and W Lab. 11, Lge. 48, Edwards County School Land, elev. 3,595 ft., flow 698 bbl., pay lime 4,912 ft., acid 12,000 gal., T.D. 4,957 ft.

Taylor-Link, Pecos County: William Wolfe 1-C University, NW NE Sec. 33, Blk. 16, University Sur., dry, T.D. 1,528 ft.

William Wolfe 6-A University, 1,650 ft. from E, 2,310 ft. from S, Sec. 26, Blk. 16, University Sur., pump 19 bbl., pay 1,692 ft., T.D. 1,707 ft.

Wasson, Yoakum County: DeKalb Agric. Ass'n. 4 Annie Armstrong, 3,195 ft. from N, 2,085 ft. from E, Sec. 889, Blk. D, J. H. Gibson Sur., flow 552 bbl., lime pay 5,008 ft., acid 10,000 gal., T.D. 5,082 ft.

TEXAS PANHANDLE

ABILENE, Tex.—The lone wildcat in the Panhandle district, Stanolind Oil & Gas 1 Corbin, Section 275, Block B-4, H.&G.N.R.R. Survey, Armstrong County, was drilling below 3,000 ft. The test is located south of Caudle, and is to test the Ellenburger zone.

PANHANDLE COMPLETIONS

Carson County: Cities Service Oil 2 Whitmore, 660 ft. from N, 1,950 ft. from W, Sec. 14, Blk. 7, H.&G.N. Ry. Sur., elev. 3,418 ft., pump 72 bbl., granite wash pay 3,161-90 ft., T.D. 3,194 ft.

Gray County: Phillips Pet. 2 B. L. Hope, 660 ft. from N and E, Sec. 87, Blk. B-2, H.&G.N. Ry. Sur., elev. 3,092 ft., I.P. 137 bbl., pay 2,885 ft., shot 180 qt., T.D. 2,952 ft.

Hutchinson County: Panhandle Prod. 4-B Herring, 2,000 ft. from S, 1,238 ft. from W. R. Walters Sur., elev. 3,312 ft., flow 21,000,000 cu. ft. gas, pay 3,120 ft., T.D. 3,135 ft.

Shamrock Oil & Gas 6 Stewart, 660 ft. from S, 1,920 ft. from W, Sec. 19, Blk. M-16, A.B.&M. Sur., elev. 3,323 ft., pump

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EASTERN TEXAS

Rodessa Pays Being Tested In Henderson Wildcat

DALLAS, Tex.—Stanolind Oil & Gas Co. 1-B Tri-Cities unit, Wiley Kay Survey, 6 miles southwest of Athens, which is testing the Rodessa zones through perforations above 7,700 ft., on last gage flowed 10.2 bbl. distillate in 8 hours through ½-in. choke. Previous to this it flowed 20 bbl. distillate with a trace of water through 2-in. tubing in 12-hour test.

Panola County.—Union Producing Co. 1 Black, C. Black Survey, which indicated gas production from the Pettit lime topped at 5,699 ft., was coring ahead at 6,100 ft. with no shows of oil reported. Rogers Lacy 1 Burnett, S. B. Hendricks Survey, drilled through the Rodessa zone without making a test, and was drilling below 5,300 ft. expecting the top of the Pettit at about 5,600 ft.

Wood County.—Jackson & Fisher 1 McCarley, 5 miles northeast of Quitman, reported show of oil in cuttings from 4,950-5,060 ft., probably Woodbine sand, was bottomed at 5,100 ft. and was preparing to test the showings.

EAST TEXAS COMPLETIONS

Wildcats

Cherokee County: L. O. McMillan 1 New Birmingham Dev. Co., 660 ft. from N and W 161-ac. lease, 660 ft. from N, 4,100 ft. from E, E. L. Jordan Sur., elev. 418 ft., Pecan Gap 3,935 ft., Austin 4,842 ft., dry, T.D. 5,148 ft.

Hunt County: Stanolind Oil & Gas 1 Tilson heirs, 330 ft. from N and W 112-ac. tract, C. C. Dale Sur., elev. 625 ft., Woodbine 3,564 ft., Georgetown 3,966 ft., Paluxy 4,358 ft., pump 128 bbl., Paluxy sand pay 4,370 ft., perf. 4,361-66 ft., T.D. 4,391 ft. Discovery.

Hunt County: O. W. William 1 E. L. Wald, 330 ft. from S and E, 102-ac. tract, J. House Sur., elev. 588 ft., dry, T.D. 3,665 ft.

Robertson County: Magnolia Pet. 1 P. Doremus, 913 ft. from easterly SE, 330 ft. from easterly NE, 200-ac. tract out of 1,466-ac. lease, Sam Kinney Sur., dry, T.D. 4,712 ft.

Fields

Cayuga, Anderson County: Shaw Oil 2 Royall & Cone, 467 ft. from N and W 95-ac. tract, Thos. Bristow Sur., elev. 302 ft., I.P. 85,000,000 cu. ft. gas, Woodbine pay 3,944 ft., T.D. 4,067.

Quitman, Wood County: Shell Oil 4 J. B. Goldsmith, 1,993 ft. from N, 660 ft. from W, W. W. Lanier Sur., elev. 436 ft., flow 97 bbl., Paluxy pay 6,215-48 ft., T.D. 6,414 ft.

TEXAS GULF COAST

Third Deepest Well Plugged Back for Dual Completion

HOUSTON, Tex.—J. S. Abercrombie and Magnolia Petroleum Co. 1-B McDonald, in the Old Ocean field, which a few months ago seemed to be on its way toward establishing the world's deep-hole record, has been subjected to an experimental dual completion. The well lost several joints of drill pipe after reaching total depth of 14,378 ft., the deepest hole in Texas and the third deepest anywhere. It was plugged back for completion in higher levels. From sand topped at 10,050 ft. the well is reported to be flowing 587 bbl. daily through 16/64-in. choke, and from sand topped at 9,620 ft. 300 bbl. daily through 11/64-in. choke.

Jefferson County. — Trouble continues to beset Glenn H. McCarthy, Inc., 1 Hebert Trust, wildcat 4 miles southwest of Viterbo, Jefferson County, which blew out last month after reaching total depth of 10,092 ft. in sand, and was out of control 9 days. The well is now dead, but the 7⅝-in. casing and part of the 10¾-in. surface casing seem to have been cut out, for the well has begun to crater at the surface.

Harris County.—Cities Service Oil Co. 1 Witcher, 3 miles north of Alief, was waiting on orders after undergoing further testing. The well flowed an ungaged volume of gas, oil, and salt water through ⅛-in. choke from perforations at 7,925½-27½ ft., with tubing pressure of 2,050 lb.

Liberty County. — Ohio Oil Co. 1 B. E. Quinn, 4½ miles northeast of Cleveland, at plugged-back total depth of 8,934 ft., attempted two drill-stem tests through perforations at 8,840-8,934 ft., using open-hole packers, and in both cases the packers failed to hold. A drill-stem test made at 8,770-8,934 ft., using full-hole collapsible packer, with ¼-in. chokes at top and bottom, produced 2-lb. working pressure on the surface and recovered 32 thribbles of salt water, with no oil. The operation is waiting on orders.

TEXAS GULF COAST COMPLETIONS

Wildcats

Jackson County: Forrest Development Co. 1 John M. Bennett, 1½ miles NE of La Salle, dry at 6,003 ft.

Matagorda County: Brewster-Bartle Drilling Co. 1 Fuller-Nelson, I.&G.N. Sur., A-253, dry at 9,010 ft.

Fields

Barbers Hill, Chambers County: Mills Bennett Producing Co. 3-B Gulf fee, William Bloodgood Sur., A-5, O.W.W.O., old P.B. T.D. 4,698 ft., new P.B. T.D. 4,542 ft., 103 bbl. oil and 95 bbl. salt water, pumping, perf. 4,292-4,322 ft. and 4,340-52 ft.

Texas Gulf Producing Co. 8-B Kirby Petroleum Co., H. Griffith Sur., A-12, O.W.W.O., old T.D. 5,295 ft., new P.B. T.D. 4,382 ft., 292 bbl., pumping, perf. 4,363-76 ft.

Texas Gulf Producing Co. 23-B Kirby Petroleum Co., O.W.W.O., old P.B. T.D. 4,800 ft., new P.B. T.D. 4,025 ft., 110 bbl., pumping, perf. 3,995-4,010 ft.

Texas Gulf Producing Co. 24-B Kirby Petroleum Co., O.W.W.O., old P.B. T.D. 5,095 ft., new P.B. T.D. 4,856 ft., 93 bbl. oil and 93 bbl. salt water, pumping, perf. 4,850-55 ft.

Clodine, Fort Bend County: Houston Oil Co. 6 E. E. Thompson, H. D. Brown Sur., 157 bbl. through ⅛-in. choke, T.P. 800 lb., C.P. 1,300 lb., gas-oil ratio 517, perf. 7,502-03 ft., T.D. 7,527 ft., P.B. 7,507 ft.

Fig Ridge, Chambers County: British American 1 H. O. Acon, H.T.&B.R.R. Sur. 105, A-151, dry at 9,430 ft.

Harmon, Jackson County: Texas 1 W. W. McCrory, G.F.&M.T. Simon Sur., A-293, 72 bbl. through 6/64-in. choke, T.P. 800 lb., gas-oil ratio 760, perf. 5,414-20 ft. and 5,434-41 ft., T.D. 5,460 ft., P.B. 5,446 ft.

Livingston, Polk County: Gem Oil Co. 1 Ola Duff and Mary Kimes, A. Viesca Sur., A-77, dry at 7,140 ft.

Lovell Lake, Jefferson County: Humble 24 Broussard Trust, M. Grangia Sur., A-26, O.W.W.O., old T.D. 7,814 ft., new P.B. T.D. 7,735 ft., 130 bbl. through ⅛-in. by 6-in. chokes, T.P. 1,125 lb., gas-oil ratio 823, perf. 7,719-20 ft.

Mercy, San Jacinto County: P. G. Lake, Inc., 1 M. G. Allison, William Double Sur., A-93, 204 bbl. through ⅛-in. choke, T.P. 600 lb., S.I. C.P. 500 lb., gas-oil ratio 985, T.D. 8,293 ft.

North La Ward, Jackson County: Harry Edwards et al 1 C. Brandes, J. White Sur., A-52, 121 bbl. through ⅛-in. choke, T.P. 480 lb., C.P. 950 lb., gas-oil ratio 321, perf. 5,206-26 ft., T.D. 5,246 ft., P.B. 5,228 ft.

Hewitt & Daugherty 5 W. C. Owens, Patrick Scott Sur., A-69, 46 bbl. oil and 4 bbl. salt water through ⅜-in. choke on gas lift, jetting, with 450 lb. pressure, input ratio 3,800, perf. 5,227-30½ ft. and 5,212½-15½ ft., T.D. 5,704 ft.

Orange, Orange County: Union Producing Co. 2 Lutcher & Moore Lumber Co., J. Dyson Sur., A-8, O.W.W.O., old P.B. T.D. 4,120 ft., 13,500,000 cu. ft. gas open flow through 2½-in. tubing, R.P. 1,705 ft., perf. 4,095-4,105 ft.

Stewart, Jackson County: Humble 2 Bertha Copsey, George Sutherland Sur., A-75, dry at 6,998 ft.

Stowell, Jefferson County: Glenn H. McCarty, Inc., et al 1 Crawford et al, R. H. Parker Sur. 158, A-651, O.W.W.O., old P.B. T.D. 8,980 ft., new P.B. T.D. 8,875 ft., 192 bbl. through ¼-in. by 6-in. chokes, T.P. 360 lb., gas-oil ratio 1,232, perf. 8,862-72 ft.

West Mauritz, Jackson County: John B. Coffee 4-B Mauritz Bros., M. L. York Sur., A-312, 132 bbl. through 3/32-in. choke, T.P. 750 lb., C.P. 1,600 lb., perf 5,588-94 ft., T.D. 5,644 ft., P.B. 5,600 ft.

LOUISIANA GULF

Deep Wildcat Is Completed In Second Sidetracked Hole

NEW ORLEANS, La.—Union Sulphur Co. 1 J. P. Gueno, Branch area wildcat in Acadia Parish, with its eventful record of blowout, fire, and a complicated fishing job, has been completed in the second sidetracked hole at total depth of 10,557 ft., plugged back to 10,460 ft. Initial production, based on a 10½-hour gage, was at the rate of 26 bbl. of 61.4-gravity distillate and 3,155,000 cu. ft. of gas daily, along with 10 per cent fresh water. The well has been shut in. The operator's 2 Gueno, drilled as a relief well to No. 1, was temporarily abandoned at plugged-back depth of 10,160 ft. Continental Oil Co. 1 Acadia Parish School Board, a mile north of the Richie field, which has had a protracted fishing job, washed over the stuck drill pipe to 6,043 ft., cut and pulled drill pipe to 6,026 ft., and set cement plug 5,747-5,547 ft. It was waiting for cement to set and was expected to sidetrack. At Sun Oil Co. and Standard Oil Co. of Ohio 1 Daily, 7 miles west of Crowley, in Acadia Parish, efforts were being made to kill the well and plug back. No additional gages were reported for this wildcat, which previously was said to have flowed 25.6 bbl. of distillate through ⅛-in. choke.

St. Mary Parish. — The Jeanerette field has been extended 1¼ miles to the northeast with Atlantic Refining Co. 1 Adeline Sugar Factory Co. showing for 292 bbl. of oil production daily, through 9/64-in. choke, from perforations topped at 11,455 ft. Tubing pressure was 2,000 lb. and gas-oil ratio 800. The oil was of 34.6 gravity. J. S. Abercrombie et al 1 Alexander Charles Unit 2, in St. Landry Parish, 2 miles southwest of Leonville, was drilling at 10,112 ft. in shale. It was reported to have begun kicking and showing oil on ditch at 9,800 ft.

Orleans Parish.—W. T. Burton 9 State, in Lake-11s-14e, which once was reported as abandoned and then resumed drilling, cemented 7-in. casing at 8,740 ft. and was waiting for cement to set.

LOUISIANA GULF COAST COMPLETIONS

Wildcats

Acadia Parish: Union Sulphur Co. 1 J. P. Gueno, 51-8s-2e, 26 bbl. distillate and 3,155,000 cu. ft. gas, with 10 per cent fresh water, through 18/64-in. and 8/64-in. chokes, with two flow lines, T.P. 1,875 lb., C.P. 125 lb., gas-oil ratio 53,000, T.D. 10,557 ft., in second sidetracked hole, P.B. 10,464 ft. Discovery.

St. Mary Parish: Texas 4 State-Cote Blanche Island, Bay-15s-7e, dry at 8,540 ft.

Fields

Avery Island, Iberia Parish: Humble 4 Petit Anse Co., 25-13s-5e, O.W.W.O., old T.D. 9,050 ft., new T.D. 8,994 ft., 201 bbl. through ⅛-in. choke, T.P. 1,400 lb., gas-oil ratio 436, perf. 8,970-85 ft.

Bayou des Allemands, St. Charles Parish: Amerada et al 2 T. D. Sellers, 14-15s-20e, 171 bbl. through ⅛-in. choke, T.P. 1,400 lb., gas-oil ratio 912, perf. 9,980-89 ft., T.D. 10,593 ft.

Bayou Couba, St. Charles Parish: Gulf 5 Delta Securities Co., 7-15s-22e, dry at 8,440 ft.

Caillou Island, Terrebonne Parish: Texas 1 Jastremski, 30-23s-20e, 15 bbl. distillate and 1,257,950 cu. ft. gas through 9/64-in. regulator at 3,000 ft. and 5/32-in. tubing choke on top, T.P. 2,500 lb., gas-oil ratio 83,850, perf. 8,180-94 ft., T.D. 10,205 ft., P.B. 8,196 ft., completed as S.I. gas well.

Lake Pelto, Terrebonne Parish: Texas 29 State-Lake Pelto, 29-23s-18e, 227 bbl. through 1-in. choke, T.P. 2,125 ft., gas-oil ratio 334, perf. 11,080-92 ft., T.D. 11,200 ft.

Paradis, St. Charles Parish: Texas 1 Mrs.

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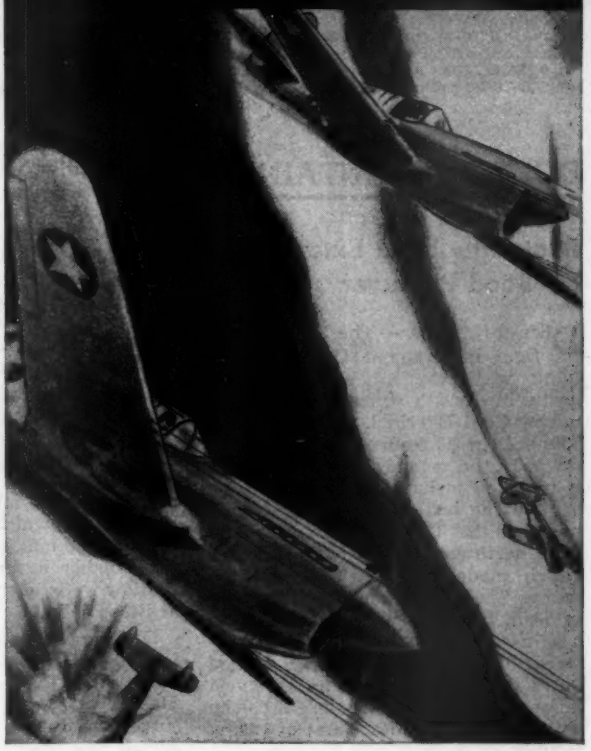

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GARLOCK

Alice Armstrong et al, 29-14s-20e, 227 bbl. through 11/64-in. choke, T.P. 950 lb., gas-oil ratio 486, perf. 10,268-10,320 ft., T.D. 10,450 ft.

Port Barre, St. Landry Parish: W. M. Helis et al 2 Sam W Futral, 7-6s-6e, 90 bbl. through 6/64-in. choke, T.P. 630 lb., perf. 6,785-6,800 ft., T.D. 7,394 ft.

Pan American 15 H. L. Garland, 4-6s-5e, O.W.W.O., old T.D. 5,323 ft., new P.B. T.D. 5,180 ft., 156 bbl. through ⅛-in. choke, T.P. 900 lb., gas-oil ratio 386, perf. 5,100-14 ft. and 5,122-34 ft.

Quarantine Bay, Plaquemines Parish: Gulf 9 State QQ, 18-19s-17e, O.W.W.O., old T.D. 8,573 ft. in sidetracked hole, new P.B. T.D. 8,131 ft., 113 bbl. through 11/64-in. choke, T.P. 1,925 lb., gas-oil ratio 9,800, perf. 8,120-28 ft.

South Houma, Terrebonne Parish: Humble 1-B La Terre Co., Inc., 81-18s-18e, dry at 10,281 ft.

Vinton, Calcasieu Parish: Union Oil Co. 8-G J. G. Gray estate, 33-10s-12w, 176 bbl. through ⅛-in. choke, T.P. 920 lb., C.P. 920 lb., gas-oil ratio 511, perf. 5,685-5,715 ft., T.D. 5,830 ft.

West Cote Blanche, St. Mary Parish: Texas 18 State-West Cote Blanche Bay, Bay-15s-6e, 130 bbl. through ⅛-in. choke, T.P. 920 lb., gas-oil ratio 661, perf. 8,562-70 ft., T.D. 10,188 ft.

ROCKY MOUNTAIN

Pilot Butte Field Extended By Good Producer

DENVER, Colo. — The Pilot Butte field in Fremont County, Wyoming, was extended ¼ mile to the north in British-American Oil Producing Co. 1-D Tribal, which swabbed 399 bbl. in 20 hours from the Tensleep. In the second 24-hour period it is reported to have made 750 bbl. on a swabbing test. It is located ¾ mile north of the Tensleep discovery and is a northwest offset to 2-A Tribal which made 650 bbl. daily on the pump. The formation was found 40 to 50 ft. higher than a recent discovery in the Sundance on a trend toward Steamboat Butte field. It had oil in the Embar, but plans for a test before completing in the Tensleep were abandoned on account of casing trouble.

Gas in Frontier at Steamboat Butte. British-American Oil Producing Co. 1-C Tribal, SW SW 32-4n-1w, an offset on the northwest to the Sundance sand discovery well on Steamboat Butte, topped the Frontier at 2,793 ft., and on a drill stem test at 2,795-2,856 ft., open 25 minutes, gaged 3,710,000 cu. ft. of gas.

The discovery well, which pumped 623 bbl. initial from the Sundance, had gas in the Frontier, but did not test. Upon drilling deeper it had a good show of oil in the Dakota (370 ft. in 1 hour on a drill-stem test) and then continued on down to the Sundance where it was completed. It was started as a test to the Tensleep. The structure adjoins the Pilot Butte field on the north.

Oil well at Shawnee. — Joe Kaufman 1 Government, which bailed 30 bbl. in 24 hours at 641 ft., is in a district in which a number of shallow wells were drilled over a wide area several years ago, many of which had oil or gas shows. These were completed in a lenticular sand in the base of the White River formation, a deposition over much older and faulted beds. The sand varies from a few inches to a few feet in thickness, and while some of the wells came in for substantial shows, they failed to hold up. A north offset to the present well made 2,800,000 cu. ft. of gas, initial, at 525 ft. A south offset was estimated at 40 bbl., but was subsequently abandoned. The area is about 15 miles east of the district in which the Superior and Ohio Oil companies are drilling a series of core holes down to the Sundance at around 2,500 ft. to work out the subsurface geology.

Gas east of Fulcher basin.—Southern Union Production Co. 1 Couzens, C SW 18-29n-11w, San Juan County, New Mexico, a semiwildcat, was drilled to 1,890 ft., and had a gas sand, probably the Picture Cliff, at 1,855-85 ft. It is waiting for government inspector to make a test. It is between the Fulcher basin gas wells and the shallow wells in the Farmington sands at Bloomfield.

Drilling resumed at Maverick.—Drilling operations at Maverick Springs, north of the Pilot Butte and Steamboat Butte fields, which were suspended during the winter, were resumed this week when the Continental Oil Co. spudded its 18 Chatterton, NW SE NW 15-6n-2w. The 1942 campaign was completed before winter set in with the exception of one Ohio Oil Co. well.

Meeting at Casper.—The petroleum-industry production committee for District 4 met at Casper the past week to work out plans for uniform job classification and replacement schedules under the PAW manpower program. The purpose is to retain key men essential to operation and give the selective service boards factual information for the granting of deferments. Consideration also was given to Montana producers who sought a higher classification of reserves in that state and certain concessions were made in their favor.

WYOMING COMPLETIONS

Pilot Butte, Fremont County: British-American Oil Producing Co. 1-D Tribal, CWL SW NW 15-3n-1w, T.D. 6,349 ft., top Tensleep 6,204 ft., 7-in. 6,242 ft., swabbed 399 bbl. in 20 hr.

Shawnee, Converse County: Joe Kaufman 1 Government, SW SW NW 25-32n-69w, T.D. 641 ft., oil rose to within 80 ft. of top, bailed 30 bbl. in 24 hr.

MONTANA COMPLETIONS

Cut Bank, Glacier County: Trigood Oil Co. 1-X Tribal-229, SE NE SE 25-32n-6w, T.D. 3,053 ft., 7-in. 3,011 ft., Cut Bank sand 2,975-3,052 ft., main pay 3,037-52 ft., swabbed 225 bbl. first 16 hr., then shot with 20 qt. at 3,037-52 ft., cleaning out.

William Hanlon-A. B. Cobb & Co. 1 Tribal-224, SE SE SE 13-32n-6w, T.D. 2,989 ft., 7-in. 2,900 ft., show of oil in Sunburst at 2,880-90 ft., Cut Bank 2,920-63 ft., main pay 2,950-63 ft., swabbed 30 bbl. first 8 hr.

Kevin-Sunburst, Toole County: Texas Co. 11 D. K. Bruin, NW SE NE 10-35n-2w, T.D. 1,665 ft., Ellis-Madison 1,650-53 ft., acid. 500 gal., pumped 70 bbl. in 10 hr.

Mills Oil Co. 4-A Government, NE NE SE 8-35n-2w, T.D. 1,644 ft., Ellis-Madison 1,599 ft., show of oil, break 1,610-18 ft., show of oil, acid. 1,000 gal., would not take acid, plugged.

Pfabe-Engleking 4 Hurley, NW SE NW 8-35n-2w, T.D. 1,455 ft., contact 1,445 ft., show of oil in break at 1,450-55 ft., acid. 500 gal., pumped 6 bbl. per day.

NORTHWEST NEW MEXICO

Hospah, McKinley County: Petroleum Products Corp. 33 State, SW SW NE 36-18n-9w, T.D. 1,798 ft., Hospah sand 1,787-98 ft., pumped 118 bbl. of fluid per day, 30 per cent water.

Permian Basin, Panhandle

(Continued from Page 73)

265 bbl., dolomite pay 3,159 ft., T.D. 3,196 ft.

Power Pet. 2-C Haile, 990 ft. from S, 330 ft. from W, Sec. 13, Blk. L, E.L.&R.R. Ry. Sur., elev. 2,971 ft., pump 61 bbl., lime and dolo. pay 2,943 ft., T.D. 3,015 ft.

SOUTHEAST NEW MEXICO

HOBBS, N. M.—A new shallow pool has been found in Eddy County, 4 miles south of the Loco Hills pool, in 3-19s-29e, by Jones & McKee at their 2 State. The well swabbed 75 bbl. oil in 24 hours from lime pay which was treated with acid. Total depth is 2,600 ft. In southeast Lea County, Olsen Oil and Atlantic 1 Langlie, 11-25s-37e, perforated casing with 120 shots opposite the Tubb zone in the Permian from 4,900-90 ft., and swabbed down the hole. Fluid then rose 200 ft. in the hole per hour, half of which was water and the other half oil. A new wildcat location was staked west of the West Eunice pool by Skelly Oil Co., its 1-T State, SE SE 10-21s-34e, a 4,000-ft. test.

SOUTHEAST NEW MEXICO COMPLETIONS

Wildcats

Lea County: Culbertson & Irwin 1-N Bowman, SE SE 21-17s-32e, dry, T.D. 3,117 ft.

Fields

Jackson-Grayburg, Eddy County: Aston & Fair 2-B Stevens, NE SE 26-17s-30e, flow 450 bbl., pay 3,260 ft., shot 50 qt., T.D. 3,284 ft.

Grayburg Oil 2-B Keely, SE SW 24-17s-29e, flow 338 bbl., lime pay 2,920 ft., T.D. 2,995 ft.

Nash-Windfohr & Brown 7-B Jackson, NE NW 25-17s-30e, flow 300 bbl., pay 3,190 ft., shot 200 qt., T.D. 3,256 ft.

Skelly Oil 4-B H. E. Dow, SW NW 21-17s-31e, pump 30 bbl., lime pay 3,513 ft., shot 200 qt., P.B. to 3,557 ft. from T.D. 3,571 ft.

Western Prod. 8-C Burch, SE SE 23-17s-29e, flow 160 bbl., lime pay 2,805 ft., acid 9,000 gal., T.D. 2,933 ft.

Lynn, Lea County: Repollo Oil 1-F State, NE NE 17-23s-36e, flow 840 bbl., lime pay 3,740 ft., acid 1,500 gal., T.D. 3,775 ft.

CALIFORNIA

Discovery Plugged Back and Flows in Miocene

LOS ANGELES, Calif.—Superior Oil Co. appears to have opened up a new oil field in the Wheatville district of Fresno County, but it will take another well or two before the real significance of Superior's discovery becomes evident. Superior's Wheatville discovery is 81-22 Kreyenhagen in 22-17s-18e, and it was brought in flowing 130 bbl. of clean 39.5-gravity oil. Gas pressure was fairly good, 450 lb., but gas volume and gas-oil ratio were low.

This wildcat was carried down to 9,562 ft. but was subsequently plugged back to 6,700 ft. when the lower part of the hole failed to yield commercial production of either oil or gas. Following this plug-back job, the company redrilled the interval to 6,855 ft. and completed the well with perforations open at 6,848-55 ft. This means that the wildcat is flowing from 7 ft. of perforations opposite probable Miocene rocks. The limited amount of oil sand indicates the area might be of secondary importance but the value of this field from a production standpoint must be held in abeyance pending additional drilling. This wildcat shows characteristics quite similar to those prevailing in the Helm and Riverdale fields, the most important of which is the small amount of oil sand existing in the Miocene. Superior's discovery is located about 4 miles southeast of the Helm distillate field and approximately 7 miles west of Riverdale.

Helm, which was discovered by the Amerada Petroleum Corp. a short time prior to the same company's discovery of Riverdale, has subsequently been found to be a distillate field and accordingly development work has been severely reduced and production stopped entirely. First production was developed at Helm in October 1941 and initial production was found in the Riverdale field in December of the same year.

Gas wells.—Shell Oil Co., Inc., has not lost any time since taking over the property of Buttes Oilfields, Inc., in the Marysville Buttes gas field of Sutter County because location has already been graded for Shell's initial test. The Marysville Buttes gas field is the only one of its kind in California as the gas accumulation is around a volcanic core of igneous rocks. In the Rio Vista gas field, Peter Cook has completed his well No. 4 in 17-4n-3e at 4,376 ft. but a flow test has not yet been made. Out of four wells drilled by Cook, two have proved commercially productive and two were wet. Drilling equipment has not yet been moved in by Standard for its projected Suisun wildcat but will probably be put on ground shortly.

SAN JOAQUIN VALLEY COMPLETIONS

Belridge, South, Kern County: Belridge Oil Co. 57-34-A fee, 34-28s-21e, pumped 30 bbl. net, 19.4-gravity, 28.1 per cent cut, T.D. 793 ft., 100-mesh perf. 464-793 ft., completed in South Belridge zone of Pleistocene age.

Belridge Oil Co. 67-34-A fee, 34-28s-21e, pumped 55 bbl. net, 14-gravity, 27 per cent cut, T.D. 785 ft., 100-mesh perf., 416-785 ft., completed in South Belridge zone of Pleistocene age.

Chansior-Canfield Midway Oil Co. 2-11 B.F., 11-29s-21e, pumped 21 bbl. net, 13.9-gravity, 80 per cent cut, T.D. 1,216 ft., 100-mesh perf. 1,036-1,216 ft., completed in South Belridge zone of Pliocene age.

General Petroleum Corp. 41-11 Belridge, 11-29s-21e, pumped 50 bbl., 15.6-gravity, 8 per cent cut, T.D. 1,080 ft., perf. 848-936 ft., 981-1,049 ft., completed in South Belridge zone of Pliocene age.

Shell 1 T.W.A., 1-29s-21e, pumped 179 bbl. net, 15.8-gravity, 16 per cent cut, T.D. 1,130 ft., P.B. 975 ft., perf. 800-95 ft., 930-73 ft., completed in South Belridge zone of Pliocene age.

Buena Vista Hills, Kern County: Standard 73-11-D, 11-32s-24e, pumped 48 bbl., 27.5-gravity, 0.5 per cent cut, T.D. 2,720 ft., 60-mesh perf. 2,650-2,718 ft., completed in Buena Vista Hills zone of Pliocene age.

Coalinga, East, Fresno County: Shell 137-29-fee, 29-19s-15e, pumped 56 bbl. net, 20.9-gravity, 26 per cent cut, T.D. 2,072 ft., perf. 1,961-2,070 ft., completed in East Coalinga zone of Pliocene age.

Kern Front, Kern County: Standard 17-5 fee, 5-28s-27e, pumped 2 bbl. net, 14.1-gravity, 35 per cent cut, T.D. 2,770 ft., P.B. 2,673 ft., perf. 2,570-2,670 ft., M point 2,390 ft., N point 2,493 ft., Q point 2,570 ft., S point 2,722 ft., complete in Kern Front zone of Pliocene age.

Standard 25-5 fee, 5-28s-27e, pumped 236 bbl., 11.8-gravity, 5 per cent cut, T.D. 2,777 ft., 100-mesh perf. 2,600-2,775 ft., completed in Kern Front zone of Pliocene age.

Lodi wildcat district, San Joaquin County: Bankline Oil Co. 3-1 Community, 4-4n-7e, abandoned as unproductive with mechanical trouble contributing factor, T.D. 3,638 ft., Ione sand 2,450 ft., Capay shale 2,505 ft., gas zone absent at this location.

Midway-Sunset, Kern County: Chansior-Canfield, 91-8 fee, 8-32s-23e, pumped 10 bbl., 13.1-gravity, 16 per cent cut, T.D. 1,510 ft., gun perf. 1,105-15 ft., 1,130-90 ft., 1,405-95 ft., completed in Midway-Sunset zone of Pliocene age.

Oakes & Combs, 1 U.S.L., 30-32s-24e, abandoned in shale, T.D. 3,100 ft., form. test 2,410-2,560 ft., open 50 min. recovered 440 ft., of oily gassy mud.

Vedder Petroleum Corp. 5 Vedder, 9-31s-22e, abandoned in gray sand, T.D. 1,230 ft., oil sand was absent at this location out in west end of field.

Riverdale, Fresno County: Amerada 38-15 Mathias, 15-17s-19e, flow 419 bbl., 36.8-gravity, 1.5 per cent cut, 12/64-in. bean, 1,205-/1,640 lb., T.D. 6,900 ft., gun perf. 6,805-15 ft., completed in Lawton zone of Miocene age.

LOS ANGELES BASIN

Orange County. — Completion of D. W. Elliott's small pumping well in the Newport section a few weeks ago did not occasion much interest until early this week when the Newport Beach council passed to second reading an ordinance permitting the development of Newport Beach tidelands. Final action is expected to be taken within the next 15 days and it is anticipated that this will be favorable as the proposed plan stipulates that all surface drilling must be located back of the beach and west of Fifty-third Street. Interest in this community's program has increased since Elliott's completion of a comparatively shallow well that was good for about 50 bbl. per day.

LOS ANGELES BASIN COMPLETIONS

Seal Beach, Orange County: Hellman estate, 14 Hellman, 14-5s-12w, flow 850 bbl., 34.8-gravity, 2 per cent cut, 400,000 cu. ft. gas, 30/64-in. bean, T.D. 6,815 ft., perf. 5,120-48 ft., 5,168-5,285 ft., 5,300-88 ft., completed in Wasem zone of Miocene age.

Wilmington, Los Angeles County: Long Beach Oil Development Co. 1-Z-2-Z, 2-5s-13w, pumped 117 bbl., 18.6-gravity, 2 per cent cut, T.D. 2,857 ft., gun perf. 2,455-2,855 ft., completed in Tar sand of Pliocene age.

COASTAL DISTRICT

Los Angeles County.—Standard Oil Co. has completed grading location for a wildcat to be drilled on the Frew property in 29-3n-16w at Aliso Canyon and General Petroleum Corp. is preparing to drill a test on the Mendota property in 22-3n-16w. The former well is a wildcat, semiwildcat or outpost depending upon what is ultimately found because the location places this well a little over 1 mile west of the most westerly producing property in the Aliso Canyon field as it is now known. This most westerly property is Standard's Sesnon lease which failed to find the Porter zone productive but which did find prolific production in a deeper zone subsequently known as the Sesnon zone. The outpost or wildcat to be drilled by Standard on the Frew property is to determine if the Sesnon zone extends that far west. A completion at this location would mean the discovery of a new field or an extensive expansion of the productive limits of the Aliso Canyon field. It might be interesting to note in this connection that the outer limits of production in the western part of Aliso Canyon remain undefined as far as the Sesnon zone is concerned. General Petroleum's new well in Section 22 is located north of Section 27 on which Tide Water Associated Oil Co. completed its discovery well several years ago. Union and Standard each drilled dry holes along the north line of Associated's Porter lease subsequent to discovery of the field.

ILLINOIS

Iola Extended or Prolific Pool Opened in Clay County

CENTRALIA, Ill.—With a considerable number of wells close to pay formations held up by high water, only 24 completions were reported from all the fields in the state in the past week in review. Ten of these were dry holes.

Seven new wildcats were listed, including Herman Goss' twin well, 10 ft. from C SW SW SW 31-1s-8w, in St. Clair County; Texas Co. 1 C. L. Kokish, SW SW SE 32-2s-4w, Washington County; Lewis Production Co. 1 W. J. Grand, SW SW NE 29-3s-3e, Jefferson County; Whisenant & Trenchard 1 Owen, SW NW NW 18-4s-14w, White County; Nate Davies et al 1 R. S. Tate, C E½ SE NE 30-8s-10e, Gallatin County; A. H. Anderson 1 White County Farms, SE NE SW 7-5s-10e, White County, and Magnolia Petroleum Co. 1 M. Logson-A, SW SW SE 1-9s-10e, Gallatin County.

Leland Wagoner 1 John Pilcher, C SW NW 13-5n-5e, Clay County, a mile east of production in the Iola pool, was reported having made 800 bbl. of oil in 24 hours after plug was drilled. It is a McClosky lime well and produced through 2-in. tubing without acid.

ILLINOIS COMPLETIONS

Wildcats

Greene County: D. S. Brooks 2 Valley Farms Co., C NW SE 30-11n-13w, dry at 765 ft.

Hamilton County: Wiser Oil 1 Echols, C N½ NW SE 33-4s-6e, dry at 3,505 ft., Golconda 2,922 ft., Barlow 3,023 ft., Cypress 3,054 ft., Paint Creek lime 3,160 ft., Benoist 3,201 ft., upper Renault 3,250 ft., Aux Vases 3,363 ft., lower O'Hara 3,372 ft., Rosiclare 3,380 ft., Fredonia 3,399 ft., McClosky 3,403-13 ft. and 3,472-78 ft., tested salt water.

Marion County: Big Chief 1 Hanes, SE SW SE 22-1n-2e, dry at 2,299 ft., Glen Dean 2,299 ft., Hardinsburg 1,665 ft., Golconda 1,735 ft., Barlow 1,820 ft., Weiler 1,860 ft., Benoist 2,001-50 ft. (no showing), Renault 2,050 ft., Aux Vases 2,061 ft., Aux Vases sand 2,081 ft., Rosiclare 2,155 ft., Fredonia 2,178 ft., McClosky 2,250 ft., St. Louis 2,288 ft.

Montgomery County: W. R. Holmes 1 C. Keune, NW NE NW 32-8n-5w, dry at 689 ft.

St. Clair County: N. W. Whitten 1 Grossman, NE SW SE 24-1s-9w, dry at 1,505 ft., Trenton lime at 1,427 ft.

Shelby County: Continental 1 Russell, SW SW SW 21-11n-2e, dry at 1,837 ft., Glen Dean 1,337 ft., Golconda 1,371 ft., Barlow 1,463 ft., Cypress 1,466 ft., Benoist 1,583 ft., Aux Vases 1,611 ft., Rosiclare 1,694 ft., McClosky none, St. Louis 1,776 ft.

Wayne County: H. H. Weinert 1 Thomas Long, C SW SE 26-1s-7e, dry at 3,390 ft., Golconda 2,784 ft., Barlow 2,880 ft., Cypress 2,890 ft., Paint Creek 3,064 ft., Paint Creek sand 3,082 ft., lower Renault 3,180 ft., Aux Vases 3,194 ft., Ste. Genevieve 3,251 ft., lower O'Hara 3,261 ft., Rosiclare 3,272 ft., Fredonia 3,305 ft., McClosky 3,312-14 ft., 3,323-71 ft. and 3,316-30 ft., tested salt water.

Fields

Covington, Wayne County: Shulman Bros. 1 Reed, C SE NW 29-1s-7e, pumped and flowed 105 bbl., lower O'Hara at 3,220-24 ft., acidized, T.D. 3,273 ft.

Deep Rock 2 Stroup, C SE SW 29-1s-7e, pumped 83 bbl., lower O'Hara at 3,170-80 ft., acidized, T.D. 3,180 ft.

Belle Rive, Jefferson County: Union Mining-Mohawk Drilling 1 Esmon, C NW NW 26-3s-4e, dry at 3,108 ft., Fredonia lime 3,098 ft., McClosky lime 3,101 ft.

Union-Mohawk 1 Hopkins-Epperson, C SW NE 27-3s-4e, dry at 3,109 ft., Barlow 2,676 ft., Paint Creek lime 2,897 ft., Paint Creek sand 2,920 ft., upper Renault 2,950 ft., Aux Vases 2,965 ft., Ste. Genevieve 3,016 ft., Fredonia 3,088 ft., McClosky 3,089-95 ft.

Clay City, Wayne County: Pure 1 J. O. Van Fossam-A, C NE SW 14-1n-8e, pumped 30 bbl. in 17 hr., then 80 bbl. in 24 hr., McClosky lime at 3,069-75 ft., T.D. 3,085 ft.

Iola, Clay County: Luttrell 11 Reid heirs, NE SW NW 14-5n-5e, junked at 1,756 ft.

Keensburg, Wabash County: Continental 3 Shultz, SE SE SE 8-2s-13w, pumped 18 bbl. oil and 2 bbl. water, sand at 2,541-84 ft., shot, T.D. 2,584 ft.

Marcoe, Jefferson County: H. J. Schlafly 3 Smith, SE SW NE 26-3s-2e, pumped 16 bbl., shot at 2,089-95 ft., T.D.

New Harmony, White County: Sun 1 E. T. Lutz, SE SW NW 30-4s-14w, pumped 68 bbl., 25 bbl. and 11 bbl. in 3 days from McClosky lime at 3,035-40 ft., 3,054-58 ft., 3,099-3,108 ft., T.D. 3,108 ft.

Longhorn et al 5 Helm, NW SE NE 27-3s-14w, pumped 45 bbl., Aux Vases sand 2,576-95 ft., shot, T.D. 2,595 ft.

North Calvin, White County: W. C. McBride, Inc., 2 H. L. Hon-A, SE NW NE 6-4s-14w, pumped 78 bbl. oil, 7 bbl. water from pay at 1,575-85 ft., T.D. 2,322 ft.

North Sims, Wayne County: Carter Oil 2 Clara M. Goff, SW NW NW 17-1s-6e, pumped 101 bbl. oil, 6 bbl. water, Aux Vases sand at 3,038-50 ft., shot, T.D. 3,050 ft.

Pure 3 Elmer Barnard, SW SE NW 17-1s-6e, dry at 3,260 ft., McClosky lime 3,199-3,203 ft.

Olney, Richland County: Southwestern 1 D. D. Boatman, NE NE NW 34-4n-10e, pumped 117 bbl., McClosky lime at 3,077-82 ft., acidized, T.D. 3,082 ft.

South Sailor Springs, Clay County: McBride, Inc., 2 B. DeHart, SE NE SE 9-3n-7e, dry at 3,058 ft., Tar Springs 2,351 ft., Benoist 2,790 ft., Aux Vases 2,876 ft., Ste. Genevieve 2,924 ft., Fredonia 2,948 ft., McClosky 2,978-3,056 ft. in streaks.

Salem, Marion County: Texas 6 E. S. Snyder, NE NW NE 16-1n-2e, pumped 171 bbl. oil and 8 bbl. water, Benoist sand 1,905-15 ft., shot at 1,918-23 ft., T.D. 1,924 ft.

Walpole, Hamilton County: Oil Carriers 1 O. Irwin, SE NW NE 35-6s-6e, pumped 157 bbl., shot at 3,098-3,103 ft., T.D.

White County: Magnolia Petroleum Co. 2 F. Rosser, SW NE NE 25-5s-10e, pumped 75 bbl., shot at 2,832-42 ft., Paint Creek sand 2,828-34 ft., T.D. 2,843 ft.

OKLAHOMA

Recent Discoveries of Oil and Gas Are Named

THE Oklahoma Steering Committee, Oklahoma-Kansas division of the Mid-Continent Oil and Gas Association, met last week to consider names for the state's new oil and gas pools. R. B. Curran, now assistant to the president of the Carter Oil Co., resigned as chairman of the committee and W. R. Thawley, head of the scouting and statistical department of the Gulf Oil Corp., was voted the new chairman.

North McLoud is the name for Stanolind Oil & Gas Co. 1 Leonard, 10-12n-2e, Lincoln County, producing 200 bbl. a day in the Wilcox. Ace Gutowsky et al 1 Wagner, 32-14n-4w, west of the Edmond pool in Oklahoma County, was named West Edward. East of the Stroud field in Creek County, J. J. Fleet 1 Adams opened the Southeast Stroud pool. It is a Prue sand producer.

Big Bend was the name given the western Osage County discovery by A. G. Oliphant and C. B. Peters at the 1 Osage in 20-25n-3e. Pay zone is the Layton sand at 2,850 ft. This well is now flowing 125 bbl. a day through choke. Extensive drilling in the new pool is expected. At the recent Osage lease sale, A. G. Oliphant and Phillips Petroleum Co. each purchased two tracts with Phillips being high bidder for the SW 21-25n-3e, and the NW Section 21.

OKLAHOMA COMPLETIONS

Wildcats

Cotton County, 4 mi. S of Walters: J. Ben Russell 1 Wisner, SW NW NW 28-2s-10w, dry, T.D. 3,221 ft., Cisco series 2,440 ft., Cisco lime 2,550 ft., show gas 1,370 ft.

Garvin County: Ed Kubat 1 Newbern, SE SW SE 14-4n-2e, dry, T.D. 4,426 ft., base Pennsylvanian 2,880 ft., Viola 2,975 ft., Trenton 3,010 ft., Wilcox 3,405 ft., McLish 3,510 ft., Oil Creek 3,985 ft., Joins 4,245 ft., Arbuckle 4,382 ft.

Okfuskee County: Jordan Pet. 1 Jefley, NE NW NE 14-10n-10e, dry, T.D. 3,284 ft., Gilcrease 2,652 ft., Wapanucka 3,170 ft.

Fields

Crescent, Logan County: Sunray Oil Co. 2 Wells, SW NW NW 26-17n-4w, flowed 324 bbl. in 12 hr., 28/64-in. choke, Layton 4,964-86 ft.

Cumberland, Marshall County: Sun Oil 1 Stout, SE SE SE 18-5s-7e, flowed 215 bbl. in 24 hr., sand 6,039-50 ft., T.D.

Edmond N.E., Oklahoma County: Harper-Turner 2 Wilson, NE NE 18-14n-2w, flowed 40 bbl., Bartlesville 5,887-5,911 ft.

Enid, Garfield County: Champlin Ref. 2 Kunkel, N½ SW NW 23-23n-6w, flowed 26 bbl., Mayes 6,092-6,198 ft.

Garber, Garfield County: Sinclair Prairie 25 Campbell, NE SE NW 30-22n-3w, pumped 23 bbl., sand 1,483-91 ft., T.D. 1,505 ft.

Lucien N., Garfield County: G. P. Dickey 2 Wooden, SW SW 25-21n-3w, dry, T.D. 5,555 ft., Layton 4,290 ft., Wilcox 5,475 ft.

Velma, Stephens County: L. W. Winkler 1 Edwards, SE NW NW 6-2s-4w, pumped 1½ bbl., T.D. 2,502 ft.

Pauline Oil & Gas 19 Green, NE SE SE 27-1s-5w, dry, T.D. 2,118 ft.

Skelly 1 Stephens, SW NW NE 36-1s-5w, dry, T.D. 2,017 ft.

Miscellaneous

Creek County: Gulf 22 Barnes, SE SW SW 8-17n-12e, input well, T.D. 1,703 ft.

Sinclair Prairie 48 Berryhill, SW NE NE 16-17n-12e, input well, T.D. 1,600 ft.

Okfuskee County: R. W. Viersen 1 Barnett, NE SW NE 4-10n-11e, dry, T.D. 2,909 ft.

Osage County: Link No. 10, NE SE NW 4-22n-12e, pumped 8 bbl., sand 1,707-21 ft., T.D. 1,753 ft.

Seminole County: Paul Traugh 1-A Atkinson, NW SW 17-6n-6e, dry, T.D. 2,926 ft.

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N. CENTRAL TEXAS

Caddo Lime Pool Opened In Archer County

WICHITA FALLS, Tex. — Phillips Petroleum Co. 1 Luke (Wilson), NW NW NE Section 117, A.T.N.C.L. subdivision, 5 miles north of Archer City, Archer County, opened a new Caddo lime-producing area last week when it flowed 109 bbl. oil and ½ bbl. drilling water on 7-hour Railroad Commission test to rate a daily potential of 763 bbl. Caddo was topped at 4,881 ft., with saturation from 4,885 ft. to 4,895 ft. The well was drilled to total depth 5,623 ft., topping the Ellenburger at 5,580 ft. with a slight showing of oil, and was perforated with 63 shots opposite Caddo lime from 4,881-91 ft. filling 3,100 ft. with fluid in 5 hours. After swab was run, the well flowed 46 bbl. in 2 hours through ¾-in. choke, and potential test was taken through ⅜-in. choke.

A new wildcat to test the Mississippi lime is L. T. Burns 14 A. F. Ickert, located 523 ft. from south, 467 ft. from west, Block 17, Crawford Pasture subdivision, 5 miles northwest of Olney, in southwestern part of the county. Contract depth is 5,500 ft.

Wilbarger County.—Rogers Brothers Drilling Co. 1 J. W. McCrory estate, Section 64, Block 14, H.&T.C.R.R. Survey, 9 miles southeast of Vernon, opened a new shallow sand producing area when it was completed for 196 bbl. per day on pump from sand 1,490-99 ft. British-American Oil Producing Co. 1 Cora E. Wilkinson, Section 103, Waggoner Colony subdivision, 5½ miles northeast of Harrold, total depth 6,133 ft., perforated with 40 shots from 5,780-90 ft., and swabbed at the rate of 40 bbl. per day. Tubing was run, and swab was lost in the hole after treatment with 1,500 gal. acid.

Clay County.—Two miles east of the new Mississippi gusher in the Joy field, Consolidated Oil Co. has staked a wildcat test, 467 ft. from south and west of northeast quarter Block 1, Webb subdivision of San Augustine University Survey, scheduled to be a 6,500-ft. test. Between the Joy field and Continental Oil Co. 1 Stephens, L. T. Burns has made location for four Mississippi lime tests, in and around Block 29, San Augustine University Survey.

NORTH TEXAS COMPLETIONS

Wildcats

Archer County: Phillips Pet. 1 "Luke" Wilson, NW NW NE Sec. 117, A.T.N.C.L. sub., flow 763 bbl., Caddo lime pay 4,881-91 ft., T.D. 5,623 ft. Discovery.

L. T. Burns 1 D. L. Bishop, 1,039 ft. from N, 467 ft. from W, Blk. 53, Meade Pasture sub., Caddo lime 4,653 ft., S.S.O. 5,310-15 ft., in Ellenburger, dry, T.D. 5,315 ft.

Martin Properties 1-A L. F. Wilson, 233 ft. from S and E Blk. 12, A.T.N.C.L. sub., dry, T.D. 603 ft.

Wilbarger County: Rogers Bros. Drlg. 1 J. W. McCrory, SE SE Sec. 64, Blk. 14, H.&T.C. Ry. Sur., pump 196 bbl., pay 1,490 ft., sand, T.D. 1,499 ft. Discovery.

Fields

Bindel, Cooke County: Texas Co. 1 M. Zipperer, 330 ft. from S, 495 ft. from W, 75-ac. lease, Henry Dixon Sur., elev. 1,146 ft., S.S.O. 3,518-22 ft., dry, T.D. 3,615 ft.

Bowers, Montague County: Burk Roy. 3 P. J. Martin, 330 ft. from N, 606 ft. from E, C. A. Barnes Sur., granite 3,665 ft., dry, T.D. 3,669 ft.

Browning, Archer County: W. J. and J. J. Moran 1 Alvin Jentsch, 660 ft. from S and W, Sec. 11, German Emigration Co. Sur., Caddo 5,109 ft., Ellenburger 5,204 ft., pump 74 ft., pay lime 5,220 ft., shot 105 qt., T.D. 5,310 ft.

Ellis, Jack County: Hanlon-Buchanan, Inc. 1-B T. C. Jones, 2,200 ft. from W, 447 ft. from N, B. J. Williams Sur., flow 531 bbl., pay lime 4,965 ft., perf. 30/4,770-76 ft., acid 3,000 gal., T.D. 4,976 ft.

K.M.A., Wichita County: Grace & Grace 3 T. P. Dorris est., 2,509 ft. from SW, 660 ft. from W, Cowherd Bros. sub., Sec. 4, H.&T.B. Ry. Sur. A-551, flow 646 bbl., pay 4,037 ft., T.D. 4,081 ft.

G. E. Kadane & Sons 1-C R. J. Bradley, 330 ft. from S, 660 ft. from W, 74.36-ac. tract, C. S. Holloway Sur. A-491, I.P. 51 bbl., pay lime 3,765 ft., shot 260 qt., T.D. 3,861 ft.

Rendham, Baylor County: British American Oil Prod. 3-L F. C. Green, 467 ft. from N, 2,146 ft. from W, Sec. 8, J. E. Hix Sur., dry, T.D. 3,087 ft.

Stoneburg, Montague County: Continental Oil 2 A. R. Winder, 497 ft. from S, 330 ft. from E, 121.06-ac. lease, Sec. 4, Limestone County School Land, flow 213 bbl., pay Caddo conglomerate 6,246 ft., T.D. 6,254 ft.

Walnut Bend, Cooke County: Sinclair Prairie Oil 1 Minnie B. Harrison, 1,642 ft. from N, 330 ft. from W, Blk. 71, Fannin County School Land, elev. 817 ft., flow 2,030 bbl., Winger sand pay 5,489 ft., T.D. 5,751 ft.

Sinclair Prairie Oil 1 R. E. Harrison, 330 ft. from N, 129 ft. from E, Blk. 70, Fannin County School Land, flow 1,684 bbl., Winger sand pay 5,506-25 ft., P.B. to 5,572 ft. from T.D. 5,741 ft.

Wichita County: Akin & Dimock 1 K. Weibner, B.B.B.&C. Ry. Sur. A-28, dry, T.D. 1,844 ft.

Ernest Prod. 1 J. N. George, O. Farish Sur. A-383, dry, T.D. 1,470 ft.

C. Y. Gorman 2 W. L. Doyle, Geo. Wheelwright Sur. A-320, dry, T.D. 336 ft.

Wilbarger County: Phillips Pet. 223 W. T. Waggoner, Sec. 46, Blk. 4, H.&T.C. Ry. Sur., I.P. 15 bbl., sand pay 1,864 ft., T.D. 1,887 ft.

Ellenburger Wildcat Started in Parker County

ABILENE, Tex. — New Ellenburger wildcat test for Parker County is Continental Oil Co. 1 J. R. Davidson, 2,309 ft. from south, 330 ft. from west of Section 242, T.&P.R.R. Survey, 4 miles southwest of Poolville. It is contracted to 6,500 ft. In Coleman County, Sohio Production Co. has staked another wildcat, to be 1 J. M. Weathered, 660 ft. from southerly north line, 819 ft. from easterly east line of Section 69, Block 2, G.H.&H. Survey. In Jones County, a new pay for the South Noodle pool was found when R. H. Roark 1 Sears, Section 37, Block 18, T.&P.R.R. Survey, was completed from the lower Hope lime at 2,730-38 ft. The well made 61 bbl. in 6 hours on potential gage.

WEST CENTRAL TEXAS COMPLETIONS

Fields

Crownover, Brown County: Guyle Greynolds 1 Ines, SE NW Sec. 26, B.B.B. &C. Ry. Sur., dry, T.D. 2,920.

Morris, Coleman County: Anzac Oil 40-J Morris, 330 ft. N and W of SW cor. Sec. 24, C. Evans Sur., but in E. H. Williams Sur. 2, elev. 1,616 ft., dry, T.D. 2,615 ft.

Rock Crusher, Coleman County: W. T. Murray 1 Bessie Wisener, 330 ft. from N and E 40-ac. tract, J. P. McLean Sur., I.P. 6 bbl., pay 3,130 ft., T.D. 3,149 ft.

South Noodle, Jones County: R. H. Roark 1 Sears, NW NW NE Sec. 37, Blk. 18, T.&P. Ry. Sur., flow 366 bbl., pay lower Hope lime, 2,730 ft., acid 1,000 gal., T.D. 2,738 ft. New pay.

Wimberly, Jones County: Butler & Horne and R. L. Foree 1 L. L. Horne, 330 ft. from S and W, E 70 ac. of farm, Lge. 137, G. Martinez Sur., dry, T.D. 2,251 ft.

Southwest Texas

(Continued from Page 72)

¼-in. choke, T.P. 150 lb., C.P. 600 lb., gas-oil ratio 100, T.D. 3,113½ ft.

Rincon, Starr County: Continental and W. R. Davis, Inc., W. D. Stephenson Sur. 907, 232 bbl. through ⅛-in. choke, T.P. 900 lb., C.P. 860 lb., gas-oil ratio 418, perf. 3,897-3,909 ft., T.D. 3,910 ft.

LOWER GULF COAST COMPLETIONS

Wildcats

Bee County: Bridwell Oil Co. St. John unit 2, 1 mi. NE of Beeville, dry at 3,909 ft.

Dirks Bros. 1 R. E. Miller, 1½ mi. NW of South Caesar field, dry at 6,523 ft.

Jim Wells County: O. W. Killam Co. 1 C. Skarke, 4 mi. W of Wade City, dry at 5,016 ft.

Sam E. Wilson, Jr., and D. Auld 1-A Maria S. de Garza, 4 mi. NE of Faulfurrias, open-flow potential 100,000,000 cu. ft. gas and 150 bbl. distillate, perf. 7,920-27 ft., T.D. 8,211 ft., P.B. 7,936 ft. Well killed and shut in. Discovery.

Karnes County: Transwestern 1 Parr-Sellers, 6½ mi. SE of Runge, 38 bbl. through 13/64-in. choke, T.P. 1,525 lb., C.P. 1,625 lb., gas-oil ratio 25,201, perf. 4,122-23 ft., T.D. 8,015 ft. Discovery, named Porter field.

Victoria County: Texas 1 F. D. Gayle, 3 mi. N of Victoria, dry at 4,003 ft.

Fields

Hobson, Karnes County: Seaboard 2 R. F. Fertsch, Erasmo Seguin Sur., A-10, 156 bbl. through 5/32-in. choke, T.P. 425 lb., C.P. 1,200 lb., gas-oil ratio 260, T.D. 4,034 ft.

La Gloria, Jim Wells County: La Gloria Operators Committee 1 La Gloria unit 19, Los Olmos y Loma Blanca grant, dual completion perf. 5,875-95 ft., 12,395,000 cu. ft. gas, with spray of distillate, through 2-in. opening, S.I. pressure 3,400 lb., gas-oil ratio 30,200, perf. 6,215-30 ft., 11,810,000 cu. ft. gas, with spray of distillate, through 2-in. opening, S.I. pressure 2,525 ft., gas-oil ratio 32,500, T.D. 7,489 ft.

North McFaddin, Victoria County: Union Producing Co. 2 Pete Rydolph, J. F. Kemper Sur., 3,500,000 cu. ft. gas through ¼-in. choke, T.P. 2,130 ft., S.I. C.P. 2,150 lb., T.D. 5,498 ft., P.B. 5,150 ft.

Odem, San Patricio County: Seaboard 7 S. L. Lane, Juan Hart & Son Sur., A-10, 105 bbl. through ⅛-in. choke, T.P. 550 lb., gas-oil ratio 1,570, perf. 5,416-22 ft. and 5,426-32 ft., T.D. 5,528 ft.

South Caesar, Bee County: Seaboard 1 H. Sparkman, Thomas Powell Sur., A-266, 73 bbl. through 7/64-in. choke, T.P. 1,600 lb., C.P. 2,175 lb., gas-oil ratio 3,137, perf. 6,551-53 ft., T.D. 6,563 ft.

Thomaston, De Witt County: Atlantic 1 Mary Brashear, Charles Lockhart Sur., A-26, dry at 8,509 ft.

SOUTH CENTRAL TEXAS COMPLETIONS

Wildcats

Travis County: Robert E. Fallin Co. 1 Otto Walters, Michael Green Sur., dry.

KANSAS

Kansas Drilling Increased Through Month of May

KANSAS drilling seems to be definitely on the way back to normal when, for the second time within the month, completions were above 40. Last week there were 20 oil wells and 21 dry holes finished.

Two important discoveries were completed last week. In Pratt County, northwest of the Iuka Simpson and Arbuckle pools, Stanolind Oil & Gas Co. 7 A. E. Frisbie, SE SW 5-26-13w, flowed 485 bbl. of 32.7-gravity oil in 24 hours through perforations in Lansing lime at 3,947-55 ft.

In Barber County, the Deerhead pool opener finished completion tests and was given a flowing potential of 2,785 bbl., one of the largest actual production tests for some time. At total depth of 5,014 ft. the well flowed 200 bbl. of oil a day into pits, naturally, and after acid treatment made 928 bbl. in 7½ hours through tubing. Shut-in pressure was 1,560 lb. Producing zone is the Viola lime at 5,005-14 ft., or minus 3,053 ft. subsea. Discovery method was by surface and subsurface geology and by core drilling.

KANSAS COMPLETIONS

Wildcats

Barber County: Champlin Refining Co. 1 Allen, SE NW SE 22-32-15w, potential 2,785 bbl., Viola 5,005-5,014 ft., discovery of Deerhead pool.

Barton County: Branine & Goering 1 Purcell, NW NW SE 20-20-13w, dry, T.D. 3,651 ft., Lansing 3,260 ft., conglomerate 3,510 ft., Arbuckle 3,600 ft.

Spencer & Carlson 1 Prosser, SW SW SW 10-17-12w, dry, T.D. 3,368 ft., Lansing 3,078 ft., conglomerate 3,334 ft., Arbuckle 3,347 ft.

Edwards County: Broderick & Gordon 1 Smith, NE SE 17-24-20w, dry, T.D. 5,110 ft., Lansing 4,070 ft., Mississippi lime 4,780 ft., Viola 4,939 ft., Simpson 5,030 ft., Arbuckle 5,066 ft.

Ellis County: Cities Service 1 Scheck, NW NW SE 30-12-16w, dry, T.D. 3,730 ft., Lansing 3,382 ft., conglomerate 3,630 ft., Arbuckle 3,700 ft.

Continental and Cities Service 1 K.S.T.C., stratigraphic test, NW NW SW 6-14-18w, dry, T.D. 3,753 ft., approximate tops, Lansing 3,375 ft., Arbuckle 3,732 ft.

Harvey County: Falcon-Seaboard 1 Neufeldt, NW SE 15-22-3w, dry, T.D. 3,820 ft., Lansing 2,475 ft., Mississippi lime 3,232 ft., Hunton 3,573 ft., Viola 3,695 ft., Simpson 3,721 ft., Arbuckle 3,800 ft.

Marion County: Westgate-Greenland 1 Unruh, SE NE NE 9-19-1e, dry, T.D. 3,380 ft., Lansing 2,240 ft., Mississippian chat 2,809 ft., Viola 3,274 ft., Simpson 3,353 ft., sand 3,377 ft.

McPherson County: D. J. Marshall 1 Eash, SW SW SW 3-20-5w, dry, T.D. 3,468 ft., Lansing 2,825 ft., Mississippian chat 3,439 ft.

Nadel & Gussman 1 Morrison. S½ SW SW 13-17-1w, dry, T.D. 2,828 ft., Mississippian chat 2,798 ft.

Pawnee County: Vickers Pet. 1 Ashworth, N½ NE NW 17-22-15w, dry. T.D. 4,028 ft., Lansing 3,496 ft., Viola 3,874 ft., Simpson shale 3,927 ft., sand 3,945 ft., Arbuckle 3,978 ft.

Pratt County: Stanolind Oil & Gas 1 A. E. Frisbie, SE SW 5-26-13w, flowed 485 bbl. in 21 hr., Viola 3,891 ft., T.D. 4,455 ft.

Hollow Drlg. 1 Thompson, SW NW NW 19-26-12w, dry, T.D. 4,509 ft., Lansing 3,750 ft., Viola 4,304 ft., Simpson 4,345 ft., Arbuckle 4,459 ft.

Superior Oil 1 Hoover, NE NE NE 24-26-12w, dry, T.D. 4,476 ft., Lansing 3,622 ft., Viola 4,243 ft., Simpson 4,332 ft., sand 4,361 ft., Arbuckle 4,433 ft., south of North Stark pool and ½ mi. S of Viola gas well.

Saline County: Falcon-Seaboard 1 Morris, W½ SE SE 33-16-3w, dry, T.D. 3,555 ft., Lansing 2,228 ft., Mississippi lime 2,888 ft., Misener 3,313 ft., Viola 3,332 ft.

Stafford County: Stanolind and Derby Oil 1 Ema Van Lieu, NE SE NE 20-24-13w, swabbed 30 bbl. in 2 hr., potential 1,618 bbl., Arbuckle 4,069-84 ft., discovery of Van Lieu pool.

J. H. Hershey 1 Dunn, SW SW NE 28-23-13w, dry, T.D. 3,990 ft., Lansing 3,456 ft., Viola 3,816 ft., Simpson 3,881 ft., Arbuckle 3,959 ft.

Zephyr Drlg. 1 Knop, NW NW NW 9-25-11w, dry, T.D. 4,118 ft., Lansing 3,474 ft., Viola 3,900 ft., Simpson 4,035 ft., Arbuckle 4,085 ft.

Fields

Bloomer, Ellsworth County: Western Petroleum Exploration Co. 1-B Stumps, NE NW 32-17-10w, pumped 104 bbl., Arbuckle 3,244-76 ft.

Bradfield, Lyon County: LeBlanc et al 1-A Bradfield, SE SW NE 25-21-10e, dry, T.D. 1,505 ft.

Chase, Rice County: Aylward Production 2 Proffitt, NE NW 20-19-9w, pumped 78 bbl., Arbuckle 3,242-56 ft.

Wylward 2 Rolfs, SE NW 20-19-9w, pumped 85 bbl., Arbuckle 3,249-62 ft.

Harwood Oil 2 Seaney, SW NE SW 30-19-9w, pumped 194 bbl., Arbuckle 3,265-72 ft.

Couch, Cowley County: Adair & Morton 1 Sandstrom, SE NE SE 11-30-5e, dry, T.D. 2,905 ft., Mississippi lime 2,887 ft.

(Continued on Page 90)

Pipe Wiper services 153 trips of pipe on well deeper than 5000-ft.

Talk about durability. this Patterson-Ballagh Pipe Wiper is a good example! It was installed on a well at Madill, Oklahoma, for 3½" pipe. The well is below 5000 feet and this Wiper made 153 trips. The Wiper was then cut out to 4½" and was working on its second well when this photo was taken. It's still in good condition and going strong. Such service can be duplicated on YOUR wells.

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OHIO, INDIANA

Two Ohio Gas Pools Are Extended

ZANESVILLE, Ohio. — The Blue Rock pool in Muskingum County was extended ½ mile to the north by the Industrial Gas Co. completion on the U. S. Government lands. The Clinton sand was found at 4,368-4,428 ft., and gaged 2,826,000 cu. ft. of gas with a rock pressure of 1,100 lb. The Hinckley pool was extended 2 miles to southwest by the Ohio Fuel Gas Co. completion on the W. A. Haldy tract in Lot 95. The well, half way between the Hinckley and Granger pools, gaged 1,000,000 cu. ft. of gas from the Clinton sand found at 3,509-61 ft. with a rock pressure of 1,270 lb.

OHIO COMPLETIONS

Ashland County, Green Township: Ohio Fuel 1 Clarence Beck, Sec. 35, Clinton, dry, T.D. 2,710 ft.

Hanover Township: Ohio Fuel 1 Mary Steitz, Sec. 23, Clinton, dry, T.D. 2,907 ft.

Jackson Township: Siler et al 5 H. E. Morr, Sec. 21, Berea, dry, T.D. 744 ft.

Mohican Township: Ohio Fuel 1 Fern Fredline, Sec. 2, Clinton, 272,000 cu. ft., T.D. 2,917.

Guernsey County, Center Township: Ohio Oil 1 P. C. Fitzgerald, Sec. 2, Clinton, dry, T.D. 5,476 ft.

Knox County, Brown Township: J. B. Reed 1 Davis and Shaw, Sec. 12, Clinton, dry, T.D. 2,842 ft.

Jefferson Township: Ohio Fuel 1 D. C. Nouse, Sec. 12, Clinton, 368,000 cu. ft., T.D. 3,098 ft.

Lorain County, Columbia Township: Ohio Fuel 1 J. P. Leisman, Lot 76, Clinton, 330,000 cu. ft., T.D. 2,716 ft.

Medina County, Granger Township: M. L. Packard 19 Anna Crocker, Lot 25, Berea, 60 bbl., T.D. 460 ft.

Ohio Fuel 1 E. R. Allard, Lot 82, Clinton, 151,000 cu. ft., T.D. 3,610 ft.

Hinckley Township: Ohio Fuel 2 Geo. McGee, Lot 34, Clinton, 178,000 cu. ft., T.D. 3,728 ft.

Ohio Fuel 1 Walter Haldy, Lot 96, Clinton, 1,000,000 cu. ft., T.D. 3,588 ft.

Steiner et al 1 R. R. Tettlebeck, Lot 38, Clinton, dry, T.D. 3,410 ft.

Meigs County, Salisberry Township: Ohio Fuel 7 D. T. Cuckler, Sec. 36, 206,000 cu. ft., T.D. 356 ft.

Mercer County, Recovery Township: Henderson 1 T. S. Hackthorn, Sec. 19, Trenton, dry, T.D. 1,643 ft.

Monroe County, Malaga Township: R. W Zerger 1 Eliz. Peters, Sec. 22, Berea, 76,211 cu. ft., T.D. 1,895 ft.

Morgan County, Marion Township: Ohio Fuel 5 N. M. Wood, Sec. 34, Stray, 579,000 cu. ft., T.D. 791 ft.

York Township: Ohio Fuel 1 B. M. Mercer, Sec. 26, Clinton, dry, T.D. 4,316 ft.

Muskingum County, Blue Rock Township: Industrial Gas 2 U.S.A., Sec. 9, Clinton, 2,826,000 cu. ft., T.D. 4,431 ft.

Salt Creek Township: Preston Oil 1 W. R. Gatewood, Sec. 4, Clinton, 26 bbl., T.D. 4,249 ft.

Noble County, Enock Township: W. T. Warren 4 W. D. Harper, Sec. 29, Berea, dry, T.D. 1,778 ft.

Noble Township: Fassett Oil 12 John Hayes, Sec. 34, Stray, dry, T.D. 247 ft.

Perry County, Clayton Township: Palm Oil 1 Albert Hamilton, Sec. 27, Clinton, dry, T.D. 3,430 ft.

Stark County, Pike Township: Obermiller 1 Harry Slutz, Sec. 10, Clinton, dry, T.D. 4,790 ft.

Washington County, Barlow Township: H. W. Baker 2 Victor Jones, Sec. 20, Stray, dry, T.D. 1,279 ft.

Wayne County, Milton Township: Ohio Fuel 1 Thos. Carnahan, Sec. 6, Clinton, dry, T.D. 3,318 ft.

INDIANA

EVANSVILLE, Ind.—One wildcat was announced in Indiana in the past week, A. B. Speak et al 1 McCarthy, NW SE NW 13-2s-11w, Gibson County.

A new pool was uncovered by Damron, Gray & Savage in 36-7s-7w, Spencer County. The discovery well, which started at 110 bbl. per day, increased its output to 120 bbl. daily with the lengthening of the stroke of the pumping unit.

INDIANA COMPLETIONS

Spencer County: Damron, Gary & Savage 1 Alvin Frank, NE SW SW 36-7s-7w, pumped 110 bbl., Palestine sand at 932-47 ft., T.D., a pool opener.

Posey County: Cherry & Kidd 3 Walgrove, NE NW NW 14-4s-14w, pumped 60 bbl., Cypress sand at 2,610-21 ft., shot, T.D. 2,624 ft.

Knox County: Sun Oil 1 Weaver NW SE NW 5-5n-7w, dry at 2,400 ft., Paint Creek 772 ft., Benoist 842 ft., Renault 878 ft., Ste. Genevieve 922 ft., Louisiana 2,108 ft., Chattanooga 2,112 ft., Devonian 2,235 ft.

EASTERN KENTUCKY

ASHLAND, Ky. — Completion of a 20-bbl. oil well marked the report of drilling operations in the eastern part of Kentucky. With the exception of this well and a dry hole, the report was devoid of other completions and highlights.

May & Amyx have completed well No. 1 on the Rufus Jackson land on Duck Fork on the Lee-Owsley County line in the Ida May district at a total depth of 1,343 ft. with a daily production of 20 bbl. of oil.

The Kentucky-West Virginia Gas Co. reports a dry hole in well No. 716 on the Bulah Meade land in Johnson County at a total depth of 2,500 ft. in Corniferous.

WESTERN KENTUCKY

OWENSBORO, Ky.—A Tar Springs sand production area was opened in Henderson County by Iley & Browning as the high spot news of the week in western Kentucky.

WELLS COMPLETED

Henderson County: Iley & Browning 1 Naomi Stern, 1¼ miles north of Poole, pumped 135 bbl. after a shot in Tar Springs sand at 1,952-76 ft., T.D., opens new producing area.

Sinclair Prairie 13 C. D. Burbank, Smith Mills pool, pumped 262 bbl. oil and 113 bbl. water from McClosky lime at 2,567-71 ft. and 2,611-20 ft., acidized, T.D. 2,731 ft.

P. O. Wall 1 Cabell-Crowder, Cypress sand 2,314-42 ft. shot, tested water and oil, but no commercial production, T.D. 2,750 ft.

Cherry & Kidd and Frontier Fuel & Oil 9 C. D. Burbank, pumped 350 bbl. in 12 hr., Cypress sand 2,302-8 ft., McClosky lime at 2,600-50 ft. not tested, T.D. 2,720 ft., P.B. to 2,600 ft.

Farm Bureau and Delta Drilling 6-A C. D. Burbank, pumped 180 bbl. Cypress sand at 2,294-2,305 ft., T.D.

Union County: Kingwood Oil 1 H. Pattsburg, 2½ miles southwest of Corydon, dry at 2,631 ft.

MICHIGAN

Discovery Is Completed For Large Flow

SAGINAW, Mich.—Field operations last week resulted in the "cleaning up" of a number of protracted drilling ventures. Of 17 completions recorded, 11 were dry holes, 1 was a natural-gas producer and the other 5 brought oil in amounts ranging from 12 bbl. a day to the 520 bbl. a day recorded from the Ohio Oil Co. new discovery well in Norwich Township, Newaygo County. Sun Oil Co. 1 Huber in Hamilton Township, Clare County, also was classed as a wildcat but its production from 4,122 ft. was only 30 bbl. a day. Six of the dry holes also were wildcat tests, three being in Allegan County.

Recent orders easing well-spacing requirements in southwestern Michigan counties was reflected in the report of the Conservation Commission showing issuance of 14 new drilling permits. Bringing the 1943 total to 176, the permits are for 3 tests each in Bay and Clare counties, 2 in Osceola, 1 each in Lapeer, Montcalm, Missaukee, Newaygo, Allegan and Van Buren.

MICHIGAN COMPLETIONS

Allegan County, Salem Township: Charles J. Smith 1 Howard, C SE SE 13-4n-13w, wildcat test, dry, T.D. 1,737 ft.

Watson Township: Columbia Oil & Gas Co. 1 Weber, SE NW SE 18-2n-12w, wildcat test, dry, T.D. 1,585 ft.

Wayland Township: Jetter & DeKrafft 1 Selkirk, NE NW SE 29-3n-11w, wildcat test, dry, T.D. 1,876 ft.

Clare County, Franklin Township: Pure Oil Co. 1 Christen, C N½ SE NE 11-20n-3w, wildcat test, dry, T.D. 3,728 ft.

Hamilton Township: Sun Oil Co. 1 Huber, C SW NW 6-19n-3w, wildcat test, pumping 30 bbl., acidized, T.D. 4,137 ft., P.B. to 4,122 ft.

Redding Township: Taggart Bros. Co. 5 Wrightman-State, C NW 3-19n-6w, 5,810,000 cu. ft. natural gas, T.D. 1,298 ft.

Gladwin County, Bentley Township: Mammoth Producing Corp. 1 Snelenberger, C SW SW 16-17n-2e, swabbing 12 bbl., acidized, T.D. 3,570 ft.

Hay Township: Mogul Oil Co. 1 Mounts, C SW NE 28-18n-1e, wildcat test, dry, T.D. 3,789 ft.

Missaukee County, Aetna Township: Gulf Refining Co. 3 Buning, C NW NE 35-22n-6w, 502 bbl., naturally, T.D. 3,840 ft.

Newaygo County, Norwich Township: Ohio Oil Co. 1 Vaughan, C S½ NE NE 29-15n-11w, wildcat test, producing 520 bbl. and salt water, acidized, T.D. 3,534 ft.

Osceola County, Cedar Township: Ohio Oil Co. 1 Boettcher et al, C S½ NW SE 28-18n-9w, dry hole, T.D. 3,942 ft.

Lupher Drilling Co. 1 Wanstead, C S½ NW SW Sec. 34, wildcat test, dry, T.D. 3,777 ft.

Osceola Township: Sun Oil Co. 1 Headley et al, C N½ NE SW 28-18n-8w, dry hole, T.D. 3,767 ft.

Ottawa County, Holland Township: Earl G. Hartman 1 Hoeksema & Geerlinges, SE SW NE 35-5n-15w, dry hole, T.D. 1,540 ft.

Van Buren County, Bloomingdale Township: Sohio Producing Co. 1 Banks, C N½ SE SW 3-1s-14w, dry hole, T.D. 1,344 ft.

Geneva Township: C. A. Perry-Cross & Gould 1 Winkel estate, NE NE SW 19-1s-16w, wildcat test, dry, T.D. 1,062 ft.

Sun Oil Co. 1 Zimmerman, C S½ SW NW Sec. 27, 196 bbl. first 16 hr., T.D. 3,809 ft.

CANADIAN FIELDS

Second Madison Found at North Turner Valley Test

CHATHAM, Ont.—A remarkable log of the lower formations is shown by Northwest-Hudson's Bay 13, LSD 9, 8-21-3w5, located on the west side of the North Extension, Turner Valley field. The test got the Madison originally at 7,255 ft. but after drilling through both porous zones it returned to the Fernie at 7,790 ft. and entered the Kootenay at 7,808 ft. For some distance the formations ran in reverse, but at 8,420 ft. the drill reentered the Kootenay and at 9,012 ft. it got the Madison lime again. Drilling will be continued to test this recurrence of the lime.

Devonian test.—In the west central section, Devonian test 1, LSD 2, 25-19-3w5, is below 8,405 ft. and has apparently passed from the Madison limestone into the Banff shales. At this depth the drill has gone through 1,165 ft. from the Madison contact at 7,240 ft. The test, financed jointly by a group of Turner Valley companies, is designed primarily to determine the oil possibilities of the underlying Devonian limestone, which has never previously been tested in Turner Valley.

Ram River. — On the Ram River-Clearwater structure, in the northern foothills west of Rocky Mountain House, Ram River Oils 2, LSD 8, 1-37-11w5, is testing production. The well bottoms at 4,325 ft., with production contact in the Devonian limestone at 4,250 ft. After swabbing a day, the well was blown, when gas, light crude and water shot up 75 ft. Gas pressure was 420 lb. and analysis indicates the water is fresh, and not from the formation. The well is flowing by heads. The crude is a high-grade product, and indications point to at least a small commercial production. Acidizing has since been started.

Vermilion.—In the Vermilion field, eastern Alberta, the Vermilion Refinery Co. conditioning plant at Borrodaile has resumed operations after installations of new equipment to provide more efficient and economical treatment of the heavy crude. The initial throughput was 528 bbl. of clean oil, but the plant will be able to take care of the entire production of the field. The Canadian National Railways has agreed to take the output at $1.50 a barrel for the first 100,000 bbl. and $1.45 a barrel thereafter. Producers will receive $1.25 a barrel for conditioned oil against 90 cents a bar-

(Continued on Page 95)

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NORTH LOUISIANA

Carter Oil Co. Completes Tensas Parish Discovery

SHREVEPORT, La.—In Tensas Parish Carter Oil Co. 2 Grace M. Rhodes, on an irregular location in 28-9n-10e, about 3 miles southwest of the Lake St, John pool was flowing 13 bbl. of 40.4-gravity oil an hour through ⅜-in. choke. Wilcox sand was found at 3,374 ft. Perforations at 4,435-42 ft. tested 5 bbl. of salt water with a show of oil; 42 shots at 4,435-42 ft. produced 9 bbl. of oil and 1 bbl. of gas-cut mud per hour. These holes were also squeezed. The last perforations were at 4,435-42 ft. and the well started to flow, with an estimated gas-oil ratio of 500 to 1.

In Logan County, Arkansas, a wildcat is under way in SW NE 26-5n-28w, 4 miles south and west of Booneville. It is the Star Manufacturing Co. 1 Jack Foster and is on a block supported by Barnsdall Oil Co., Sunray Oil Co., Lewis Production Co. and H. G. Vaughn. Sooner Drilling Co. has moved in a heavy diesel power unit and work was reported to be under way. Objective is the Jack Ford sand, a correlative of the Cromwell sand in Oklahoma.

ARKANSAS COMPLETIONS

Wildcat

Union County: Curtis Kinard et al 1 Teel, SE NW SW 11-19s-12w, dry, T.D. 3,179 ft., sand 2,184 ft., 2,668 ft., show oil.

Fields

Artesian, Calhoun County: Placid Oil 6 Freeman-Smith, SE SE 11-15s-14w, dry, T.D. 4,590 ft.

Haynesville, Columbia County: Navarro Oil 4 S. J. Beene, N½ SW SW 3-20s-20w, flowed 480 bbl., ¾-in. choke, Pettit 5,427-39 ft., 5,484-98 ft., T.D. 5,527 ft.

Hillsboro, Union County: Hunt Oil 1 Burnside, SE NE NE 24-18s-14w, pumped 25 bbl., perf. 2,188-94 ft., T.D. 2,984 ft.

Midway, Lafayette County: Gene Goff 2 Darnell, NE NE 9-15s-24w, flowed 263 bbl., Smackover 6,440-6,500 ft., T.D. 6,527 ft.

Stephens, Columbia County: R. H. Crow 1-C O. and F. Hall, SW NE NW 11-15s-20w, pumped 203 bbl., Tokio sand 2,496-2,516 ft., T.D. 2,575 ft.

G. H. Vaughn 1 L. L. Tidwell, NE NE 11-15s-20w, pumped 200 bbl., perf. 2,475-2,508 ft., T.D. 2,545 ft.

NORTH LOUISIANA COMPLETIONS

Wildcats

Caldwell Parish: T. L. Session et al 1 Louisiana Central, NE NE 27-12n-3e, dry, T.D. 7,008 ft., chalk 4,618 ft., Ozan 5,036 ft., Tokio 6,204 ft., base Paluxy 6,951 ft.

La Salle Parish: H. L. Hunt 1 W. E. Harris, NW SE 26-11n-3e, dry, T.D. 4,045 ft.

Concordia Parish: Carter Oil 2 Rhodes, 28-9n-10e, flowed 187 bbl. through choke, perf. 4,435-42 ft., T.D. 6,017 ft.

West Carroll Parish: Continental Oil Co. 2 Bruce Lumber, NE NE NE 4-20n-9e, dry, T.D. 2,686 ft.

Fields

Monroe Gas, Union Parish: J. E. Farrell 6 Steel, N½ SE NW 35-20n-3e, 5,147,000

(Continued on Page 90)

UNRETOUCHED PHOTOGRAPH OF

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APPALACHIAN FIELDS

West Virginia Oriskany Deep Test Is Dry; Two Starting

PITTSBURGH, Pa.—In Slate district, Wood County, United Fuel Gas Co. has started an Oriskany test on the F. R. Hart farm which on the Belleville Quad is located 0.52 mile south, 39° 10′ and 0.07 mile west 81° 30′. In the same district this company has also started building the rig for an Oriskany test on the J. A. Goudy farm which is located on the Elizabeth Quad 2.8 miles south 39° 10′ and 0.1 east 81° 30′. Both are on the west side of the syncline.

Wyoming County.—In Huff Creek district Godfrey L. Cabot, Inc., abandoned and plugged the deep test on the John Gilbert farm after passing through the Oriskany sand which was dry. The surface elevation is 1,158 ft., Corniferous lime 5,747 ft., Oriskany 5,847-62 ft., T.D. 6,002 ft.

WEST VIRGINIA COMPLETIONS

Boone County, Crook district: Pond Fork Oil & Gas Co. 21 fee, dry, Big lime 2,159 ft., Injun 2,366 ft., Berea 2,865 ft., brown shale 4,335 ft., T.D. 4,627 ft.

Stonewall district: Owens, Libby-Owens 30 Hoard-Baldwin, 229,000 cu. ft. gas, Big lime 1,064 ft., Injun 1,220 ft., Berea 1,821 ft., brown shale 2,330 ft., T.D. 3,085 ft.

Clay County, Buffalo district: Pittsburgh & West Virginia Gas Co. 7918 Elk River C. & L. Co., 613,000 cu. ft. gas, Big lime, T.D. 1,891 ft.

Gilmer County, Center district: South Penn Natural Gas Co. 4 T. M. Marshall, 800,000 cu. ft. gas, Big Injun sand, T.D. 1,752 ft.

Glenville district: Carnegie Natural Gas Co. 1580 John E. Arbuckle, 127,000 cu. ft. gas, Big lime 1,864 ft., Injun 1,930 ft. and 2,040 ft., gas 2,014 ft, R.P. 600 lb., T.D. 2,060 ft.

Kanawha County, Elk district: United Fuel Gas Co. 5224 Queen Land Co. 328,000 cu. ft. gas, stray sand, T.D. 1,079 ft.

Lewis County, Court House district: Pittsburgh & West Virginia Gas Co. 7005 T. T. Dolan, drilled deeper, 124,000 cu. ft. gas, started 2,335 ft., Fourth sand 2,365 ft., gas 2,375 ft., Fifth sand 2,505-11 ft., T.D. 2,527 ft.

Marion County, Grant district: Pittsburgh & West Virginia Gas Co. 6132 Antoinette L. Blair, 79,800 cu. ft. gas, Fifth sand, T.D. 2,476 ft.

Putnam County, Curry district: Summit Gas Co. 1 H. C. Alford, 240,000 cu. ft. gas, Big lime 1,571 ft., Injun 1,778 ft., Berea 2,268 ft., T.D. 2,298 ft.

Upshur County, Buckhannon district: Pittsburgh & West Virginia Gas Co. 7956 C. E. Queen, 493,000 cu. ft. gas, Fifth sand, T.D. 2,755 ft.

Wyoming County, Huff Creek district: Godfrey L. Cabot, Inc. 1068 John Gilbert, dry, Corniferous lime 5,747 ft., Oriskany 5,847-62 ft., T.D. 6,002 ft.

ORISKANY GAS FIELDS

Jackson County, Ravenswood district: Columbian Carbon Co. 709 Lillie Argabrite, 1,220,000 cu. ft. gas, Big lime 1,771 ft., Corniferous lime 4,927 ft., Oriskany 5,046 ft., shot 5,046-91 ft., T.D. 5,098 ft.

Ripley district: United Carbon Co. 1102 P. C. Greene, 1,196,000 cu. ft. gas, Corniferous lime 5,156 ft., Oriskany 5,259 ft., shot 5,264-90 ft., R.P. 1,590 ft. 36 hr., 5,294 ft.

(Continued on Page 90)

Among the

Drilling Contractors

R. H. Dearing & Sons, Dallas, Tex., have the contract to drill an 8,500-ft. wildcat for C. Andrade III, Dallas independent operator, in the northeastern part of Tarrant County in the area about 5 miles west of Grapevine. Operations will start not later than August 1 on a location to be announced later. The project will have the support of Magnolia Petroleum Co., Gulf Oil Corp., and Stanolind Oil & Gas Co.

Rowan Drilling Co., Fort Worth, Tex., has started an 8,000-ft. cable-tool test for Humble Oil & Refining Co. 1 Reynolds Cattle Co., SE NW Section 33, Block 62, Township 1s, Culberson County, Texas. It is intended to test the Ellenburger, and will be the deepest test ever drilled in this entire area. It is estimated that it will take 300 drilling days to drill the well. Previous wells drilled in the general area have encountered fissures and caverns and underground rivers.

Clay Brothers Drilling Co., Fort Worth, Tex., have contract to drill a wildcat in Parker County, Texas, for Continental Oil Co. It is 1 Davidson, Section 242, T.&P.R.R. Survey, northwest of Weatherford.

Butler & Horne Drilling Co., Dallas, Tex., has started another wildcat for its account south of the Wimberly pool in Taylor County, Texas, at 1 Moore, David T. Bruce Survey.

Patrick-Tyrrell Drilling Co., Houston, Tex., has contracted to drill a wildcat for Gulf Refining Co. in 2-9n-9w, Wayne County, Mississippi. It is the 1 Aden Davis. Patrick-Tyrrell is near contract depth of 9,700 ft. at 1 Andrew Hackett, wildcat test being drilled in Smith County, Texas, 12 miles north of Tyler, for Talbert & Wickliffe. Operator tested the Paluxy sand at about 7,300 ft.

Rowan Drilling Co., Houston, Tex., has started work on two contracts. For Tide Water Associated Oil Co. it will drill 1 Stockdick, in the Katy field, Waller County, Texas. For Gulf Oil Corp. it will drill 1 Julia Hinz, Esperson dome, Liberty County.

Oil Production Maintenance, Inc., Houston, Tex., has been awarded contract to deepen 3 E. Townes, in the Dickinson field, Galveston County, Texas, for Humble Oil & Refining Co. It will do a workover job for Humble on 2 Steinhagen, in the Lovell Lake field, Galveston County. It has a workover contract also on 4 Paggi, in the Nome field, Galveston County, for Shell Oil Co., Inc.

Big Chief Drilling Co. has the contract and was rigging up tools on Cities Service Oil Co. 1 Levy-B, in SW SE NW 22-12n-3w, on the northwest flank of the Wilcox structure, Oklahoma County, Oklahoma.

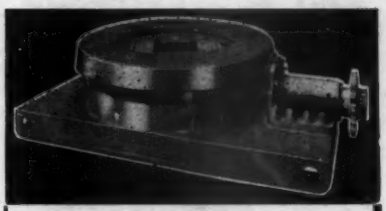
Coats Drilling Co., Midland, Tex., has been awarded contract to drill Woodley Petroleum Corp. (Llano Oil Co.) 5-B O. B. Holt estate, a 5,200-ft. test in the North Cowden deep pool of Ector County, Texas. Contractor was moving rotary to the location.

Ingling & Parker Drilling Co. has the contract and was drilling below 2,600 ft. on Alco Valve Co.'s test well on a 3,000-acre block in SE SE 32-19-3e, Marion County, Kansas.

Petroleum Well Service Co., Houston, Tex., is drilling 1 Wallace and Hancock, a wildcat test in Wharton County, Texas, 2 miles south of Hilje, in the L. L. Miller Survey, for Sam G. Harrison et al. Projected depth is 6,000 ft.

Houston Drilling Corp., Houston, Tex., has derrick up for 1 Sheblack, a wildcat to be drilled for George W. Strake in the Thomas Menefee Survey, Jackson County, Texas. Projected depth is 7,250 ft. The 1 T. N. Mauritz, 1½ miles north of the North La Ward field, Jackson County, which this contractor drilled for Salt Dome Oil Corp., was dry at the contract depth, and the operator has decided to carry the hole to 8,100 ft.

Southern Drilling & Well Service Co., Houston, Tex., is starting work on 2 Robison-Bashara for Phillips Petroleum Co. on the Blue Ridge dome, Fort Bend County, Texas, a wildcat projected to go to 5,000 ft. The 2 Robison-Bashara, recently finished in that area, was a dry hole at 5,600 ft. This contractor also has completed a dry hole at 6,000 ft. for Forrest Development Co. in the Vanderbilt area of Jackson County. It was the 1 Franek, a wildcat.



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PERSONALS

BEN R. NEWBERY

Elected President of National Purchasing Agents Association

BEN R. NEWBERY, director of purchases and material for Lone Star Gas Co. and Lone Star Producing Co., Dallas, Tex., has been elected president of the National Association of Purchasing Agents for the coming year, taking office at the twenty-eighth annual international convention of the association, at the Waldorf-Astoria Hotel, New York, N. Y., May 24, 25 and 26.

Mr. Newbery has been with the Lone Star organization since 1915, and has headed the purchasing activities of the company and its affiliates for more than 24 years.

A charter member and past president of the Dallas Association of Purchasing Agents, he was elected to the executive committee of the National Association in 1941, as vice president for District 2, and also served as financial officer of the N.A.P.A. in that year. He is likewise active in the Public Utility Buyers Group of N.A.P.A. and in the Natural Gas Section of the American Gas Association. He has taught two government-sponsored courses in purchasing at Southern Methodist University.

One of his outstanding personal interests is the Boy Scout movement. He is now serving as commissioner for a council comprising 12 Texas counties, and has been a pioneer in the development of senior scouting. He is a member of Executive Board Circle 10 Council and member of National Council of Boy Scouts of America.

Dr. Gustav Egloff, director of research for Universal Oil Products Co., and president of the American Institute of Chemists received the Columbia University Medal of Merit at the convocation of the university on June 1. This medal is awarded annually to an outstanding leader in science or technology in industry. Dr. Egloff was awarded the Ph.D. degree by Columbia in 1916, after graduating from Cornell University in 1912 with the B.A. degree.

V. B. Bottoms has been transferred to Oklahoma City, Okla., as engineer for Sinclair Prairie Oil Co., succeeding **Walter Crandall,** who has moved to Tulsa as division engineer for the company.

George P. Hinds, Jr., a chemist in the Wilmington, Calif., refinery laboratory for Shell Oil Co., Inc., has been promoted to a junior technologist at the plant.

Loren W. Dillard, head well puller at Long Beach, Calif., for Shell Oil Co., Inc., has been promoted to production foreman.

Frank M. Long and **Thomas E. Scully,** gaging foremen at Shell Oil Co., Inc.'s refinery, Wilmington, Calif., have been promoted to operating assistants in the gaging department at the plant.

O. E. McClatchey of Barnsdall Oil Co., Tulsa, was elected vice president for District 2 and reelected chairman of the Oil Company Buyers' Group, National Association of Purchasing Agents at the annual meeting in New York last week.

C. W. Armstrong, petroleum engineer in the Conroe district, Montgomery County, Texas, for Humble Oil & Refining Co., has been transferred to the Anahuac district, Chambers County. **Royal W. Reiss** has been promoted to district petroleum engineer in charge of the Kelsey Bass and Colorado districts, Jim Hogg County. **William A. Drake,** gas-plant superintendent in the Lirette district, Terrebonne Parish, Louisiana, has been transferred to the Flour Bluff gas plant in Nueces County, and **Guy J. Smyre** was made district gas superintendent in charge of the Lirette district. **H. F. Auvenshine,** chief clerk in the Tomball gasoline plant, Harris County, has been transferred to Flour Bluff. **Elroy C. McCanlies,** gas-plant chief clerk at Katy, Waller County, has been transferred to the Tomball plant, and **G. R. Miller** was advanced to gas-plant chief clerk at Katy.

D. O. (Doug) Johnson, who has been manager of the field engineering department for S. M. Jones Co. during the past 8 years, has resigned, effective June 1 to accept a position with the Gulf Oil Corp. Mr. Johnson graduated from University of Minnesota with degree in electrical engineering and was introduced to problems connected with the oil industry in his first position with Westinghouse Electric & Manufacturing Co. at Pittsburgh, Pa. Later he became more closely associated with pumping operations as field engineer for the A. M. Byers Co. He has been assigned to the Gulf mechanical engineering department, in charge of pumping operations.

George J. Wimer, foreman of drilling operations for Shell Oil Co., Inc., at Bakersfield, Calif., has been transferred to Oilfields where he will continue in the same capacity.

Ernest V. King, vice president of Fain Drilling Co., is at a hospital in Hot Springs, Ark., for treatment.

Dr. H. Beach, formerly with the Canadian Government, has resigned to take charge of the geological department of the McColl-Frontenac Oil Co., with headquarters at Calgary, Alta.

Maj. Paul G. Benedum, of Houston, Tex., was elected a member of the board of Plymouth Oil Co. last week to fill the vacancy caused by the death of Joe C. Trees. Major Benedum is a nephew of **Michael L. Benedum,** Mr. Tree's partner for almost 50 years. He is stationed in Washington with the Army Air Forces.

C. V. Sidwell, former production superintendent at Oklahoma City, Okla., for British-American Oil Producing Co., now is in charge of drilling and production in the Oklahoma-Kansas area for Northern Ordnance, Inc.

Dr. F. M. Surface, manager of the sales research department of the Standard Oil Co. of New Jersey, has been named to coordinate all sales research work for the foreign and do-

F. M. SURFACE

F. R. FICKEN

mestic companies of the Standard Oil Co. (New Jersey), with headquarters at New York City. **F. R. Ficken,** head of the statistical division of the sales research department, has been promoted to Dr. Surface's former position. Dr. Surface joined the Standard Oil Co. of New Jersey on March 16, 1933. For 6 years before joining the Standard Oil Co. of New Jersey he was assistant director of the bureau of foreign and domestic commerce in charge of domestic commerce, for the U. S. Department of Commerce in Washington. Mr. Ficken started with Standard in 1926, and in 1933 was named head of the statistical division of the sales research department.

Frank C. Smith, president of National Gas Corp., Houston, Tex., was reelected chairman of the board of the Institute of Gas Technology at the annual meeting of the Illinois Institute of Technology in Chicago, May 27-28.

Dr. Per K. Frolich, director of chemical research, Standard Oil Development Co., was one of four prominent individuals to receive honorary degrees at Lehigh University's commencement exercises May 24.

L. E. HEBL

L. E. Hebl, chief research engineer in charge of the Wood River, Ill., engine laboratory for Shell Oil Co., Inc., for the past 4 years has been appointed research director in charge of the chemical laboratory there as well. A graduate of University of Wisconsin, he joined Shell as a junior physicist at Wood River in 1928, became senior physicist in 1930 and assistant head motor-testing engineer in 1935. He will be assisted by **R. J. Greenshields,** chief research engineer in charge of the engine section, and **Dr. W. F. Ross,** chief research chemist in charge of the chemical section. Dr. Ross, now director of Radcliffe College's chemical laboratories, will assume his post June 15.

Oliver W. Holmes, stillman at Shell Oil Co., Inc.'s chemical plant in the Wilmington, Calif., refinery, has been promoted to operating assistant in the distillation division.

Jose G. Pereya, of Caripito, Venezuela, a civil-engineering graduate of University of Oklahoma, has been employed by Lago Petroleum Corp. and will leave immediately for the Lake Maracaibo area.

James Donoghue, of Denver, Colo., was reelected president of Mackinnie Oil & Drilling Co. at the annual meeting held in Cheyenne, Wyo., on May 20.

Jerry Cogan, formerly head of the working staff of the PIWC subcommittee on economics, has gone to the PAW as head of its new programming committee. Previous to his association with the PIWC committee Mr. Cogan was with the Standard Oil Co. (New Jersey) economics department.

Francis H. Taylor, engineer for drilling operations at Oilfields, Calif., Shell Oil Co., Inc., has been made San Joaquin division foreman of construction and maintenance.

Among oil men who were guests at the May meeting of the New York chapter of the Nomads were **Fred Herrschaft,** Standard Vacuum Oil Co. (seated); **Norman Rogers,** British Controlled Oilfields, Ecuador, and **F. Worsley,** chief engineer, Kern Trinidad Oil Co. (standing left to right).

R. M. Morrison, Texas Co.; **W. Howard Bratches,** Shell Oil Co., Inc., and **Joseph R. Taylor,** Socony-Vacuum Oil Co., Inc., were appointed members of a National Association of Purchasing Agents committee to devise methods for obtaining release of material now under government control but not being used as a result of concellations of contracts.

Dr. H. Gershinowitz, research director in Shell's manufacturing department, New York, N. Y., has been appointed research director for the company's Wood River, Ill., and Houston, Tex., refinery research laboratories. He has been with Shell since 1938 when he joined the company as a manufacturing department technologist. He graduated from City College of New York in 1931 and received his Ph.D. from Harvard in 1934. He became chief research chemist at Houston in 1940 and director of research there in January 1942. In October 1942 he went to the manufacturing department as research director.

Dr. Robert E. Wilson, president, Pan American Petroleum & Transport Co., received the honorary degree of doctor of laws from Colby College, at the 122nd commencement exercises last month of that institution at Colby, Me. Dr. Wilson delivered the commencement address on the subject, "Individuals and Incentives," in which he stressed the necessity of maintaining properly balanced incentives for labor, management and capital if our past rate of progress under our "hope-of-profit" system is to be continued.

D. M. S. Langworthy, who entered the Army last year from the executive department of the Gulf Oil Corp., Tulsa, was recently promoted to the rank of captain. He is now stationed in Washington where he is secretary of the Army-Navy Petroleum Board. His headquarters are in the Navy Building. **Capt. Ralph D. Curtis,** formerly of Barnsdall Oil Co., Tulsa, is also a member of the Army-Navy Petroleum Board.

Max W. David, formerly geologist for Landreth Production Corp., Midland, Tex., has been appointed district geologist for Phillips Petroleum Co. at Evansville, Ind.

Irwin Perret, of Caracas, Venezuela, petroleum engineering graduate of University of Oklahoma, has been selected for a 6-month special training course in reservoir engineering under direction of Carter Oil Co., and he will be employed in Oklahoma and Texas fields.

Market Developments

East Coast

NEW YORK.—First indication of the seriousness of the effect of the break in the big-inch line on East Coast oil supplies is contained in the report of tank shipments for the week in which the break occurred. Shipments in that week dropped to a daily average of 884,768 bbl. against 980,327 bbl. for the previous week, a drop of less than 10 per cent. However, this does not indicate the full seriousness of the situation since it was possible to load some cars from storage and the full effect could not be gaged until later.

A more accurate indication was the check on shipments made May 25, a week following the break. This check made on 25 of the largest eastern terminals which normally handle about 90 per cent of all receipts showed that these terminals handled 3,229 cars, an average of 700,693 bbl. per day. This was 16.5 per cent below the average of 859,000 bbl. per day which these terminals handled in the preceding week. Deliveries for the week ended May 29 are expected to be considerably lower not only as the full effect of the big-inch break is reflected for the first time but also as the effect of the temporary loss of rail lines serving other terminals than Norris City is felt.

Bus and delivery services were curtailed throughout the East last week as a result of the acute gasoline shortage. The most critical situations were being corrected. These were the Baltimore-Washington area shortage where supplies were brought in by tank truck to alleviate the severe shortage there and the farm requirements for which definite quotas are allotted. The Baltimore-Washington situation gave rise to a proposal to establish "war worker" stations which would supply war workers exclusively. At the same time proposals for the establishment of a priority scale were revived.

Pacific Coast

LOS ANGELES, Calif. — Gasoline prices in California appear to be somewhat stabilized although the small volume moving has been in the low-price ranges.

Gasoline production will soon begin to feel the effect of the synthetic-rubber program in which practically all large and many small refiners will participate. Wilshire Oil Co. is nearing completion of construction work on its aviation-gasoline plant and should have this unit operating within another 60 days provided needed equipment becomes available. Shell Oil Co., Inc.'s butadiene plant in the Torrance district is nearing completion and Dow Chemical Co.'s unit is already working. Southern California Gas Co. has been heating up its fire brick and should begin actual charging of stock within another several days.

Fuel-oil prices continue to vary with very little moving at prices offered which are below expectations.

Mid-Continent

MORE active calls for motor fuel were the highlight of Mid-Continent refinery markets at the start of the week. Reopening of highways with recession of flood waters in many parts of the Middle West and the advent of more favorable weather permitting farmers to reenter fields were the chief factors in stimulating demand.

Relief for some Mid-Continent refiners in adjustments of crude quotas was reported granted from Washington. Other information indicated that Middle West refiners will be given a slightly higher crude-oil quota in June and that the limitation on gasoline yield will be lifted to 90 per cent of the normal percentage.

Exclusion of southern movement of gasoline from District 2 through the indirect method of imposing tighter regulation on District 3 will relieve the supply situation to a small degree. However, gasoline movement from District 2 into District 3 much earlier became a minor factor in Mid-Continent refinery markets.

Middle West marketers reported that it is becoming next to impossible to purchase kerosene and tractor fuels in the open market. Refiners are attempting to purchase moderate amounts of gasoline, kerosene and tractor fuels from other refiners in order to cover contract commitments. However, those refiners with inadequate supplies are being compelled in most instances to prorate deliveries to contract customers and to reject new business.

Crude supplies are still inadequate at numerous plants. Slight prospect for relief is in sight until additional transportation facilities can be arranged from West Texas.

Gulf Coast

HOUSTON, Tex.—The proposed allocation of barges and equipment for transportation of heavy fuel oil from Texas and Louisiana to transfer points in Florida, for distribution in areas on the Atlantic Coast, is viewed with doubt by Gulf Coast refiners. Although expressing no criticism, and usually remarking that the administration in Washington is doing its best with an extremely difficult job, these refiners question the practicability of the barge proposal. They point out that the 100 tugboats and 305 wooden barges which it is planned to use in moving heavy residual oils from Texas and from refineries along the Mississippi River might better be used in transporting more valuable products, including gasoline, diesel oils, kerosene, and heating oils.

Although the shortage of regular gasoline was acute this week and the market for all grades was very firm, stocks of 91-octane material were said to be increasing moderately. In the Corpus Christi area particularly, inventories were said to be rising. No uneasiness was expressed. A feeling was prevalent that there was a reason for allowing generous supplies of this grade to accumulate, and that before there was any serious backing up of stocks big orders would be received. Interrefinery buying has increased noticeably in recent weeks as plant operators find themselves hard pressed to make deliveries.

Growing scarcity of natural gasoline was a subject of concern in the Gulf Coast territory this week. Buyers were shopping around in anxious and usually unsuccessful quest of supplies.

A.P.I. REFINERY REPORT

(Figures in thousands of barrels)

Week Ended May 22, 1943

	Dly. crude runs to stills	Stocks: Gasoline	Stocks: Residual	Stocks: Gas oil
Appalachian	152	2,363	480	790
Ind., Ill., Ky.	710	16,893	3,121	4,058
Okla., Kan., Mo.	341	6,512	1,505	1,748
Censored area*	1,682	34,260	11,175	13,545
Rockies	87	1,955	559	316
California	726	21,183	50,877	11,736
Total 5-22-43	3,698	85,166	67,717	32,193
Total 5-15-43	3,768	86,950	67,311	31,891
Total 5-23-42	3,382	97,021	79,296	29,658

*Reports combined on East Coast, Texas Gulf, Louisiana-Arkansas and Inland Texas at request of PAW.

CRUDE-OIL STOCKS

(Bureau of Mines Estimate)

Week ended:	Bbl. of crude*
May 22, 1943	243,660,000
May 15, 1943	241,457,000
May 23, 1942	253,423,000

*Excludes unrefinable California stocks.

Refinery Prices

(Prices as of June 1)

Quotations are f.o.b plant in cars and in cents per gallon except where otherwise noted. They are exclusive of the federal excise taxes of 1.5 cents a gallon on gasoline and 4.5 cents a gallon on lubricating oils, and do not include marine lighterage charges.

REFINERY GASOLINE

Octane (A.S.T.M.):	†80	74-76	72-74	68-70	63-66
Mid-Continent*	.....	.....	5.875-6.000	.....	5.500-5.625
Pennsylvania	.....	6.750-7.000	.....	.....	.....
Gulf Coast‡	6.00-6.50	.....	§5.750-6.250	§5.750-6.250	§5.250-5.750
Northeast Coast	9.80	.....	9.2	9.2	.....
California	.....	6.125-6.500	6.000-6.125	5.500-6.000	5.000-5.250

*Basis Group 3. †1939 C.F.R. (research method). ‡Integrated companies restricted to lowest prices. §Unleaded.

KEROSENE AND NO. 1 FUEL OIL

Gravity:	46	45	42-44	41-43	38-40
Mid-Continent*	.....	.....	4.500	4.375	.....
North Louisiana	.....	.....	.....	4.500-4.750	.....
Pennsylvania	6.250-6.625	6.125-6.250	.....	.....	.....
California	.....	.....	.....	4.500-5.500	4.250
Northeast Coast	.....	.....	.....	6.80	.....
Gulf Coast	.....	.....	.....	4.125	.....

*Basis Oklahoma Group 3.

TRACTOR, DIESEL, AND BUNKER FUEL OIL

Specifications:	46-48° G.	24 D.I.	48-52 D.I.	58 & above	Diesel bunkers	Residual Bunker C‖
Mid-Continent*	4.125	.....	.....	.....	.....	$0.80-1.27
California	.....	2.750-4.000	.....	.....	‡1.35-1.45	0.85-1.00
Gulf Coast	.....	.....	4.000	4.125	1.45	0.85-1.27
Northeast Coast	.....	.....	.....	6.800	2.780	1.65-2.07
North Louisiana	.....	.....	.....	.....	.....	0.80-1.27

*Basis Oklahoma Group 3 †10-14° gravity. ‡Pacific Specification 200. §Gravity range.

FURNACE OIL, GAS OIL, FUEL OIL

	No. 2	No. 3	No. 5	No. 6
Mid-Continent*	3.625-3.750	3.500-3.625	$0.85	$0.80
Pennsylvania (West)	5.875-6.125	5.875-6.000	†5.250-5.500	.....
Northeast Coast	6.7	6.7	1.95	1.65
California	5.5	5.5	‡1.10-1.25	§1.10-1.15
Gulf Coast	3.875-4.0	.....	1.65	0.85

*Basis Oklahoma Group 3 †36-40 gravity fuel. ‡Pacific Specification 300. §Pacific Specification 400

NATURAL GASOLINE

Grades:	26-70	18-55
Oklahoma (Group 3)	3.875	4.650
North Texas	3.500	4.200
North Louisiana	3.625	4.350
California	4.875	5.500

LUBRICATING OILS

Bright and Steam Refined

OKLAHOMA (Group 3)—		
200-210 D, 10-25		27.00
150-160 D, 0-10		23.00
120-125 D, 0-10		22.00
Steam refined:		
600 dark green (untreated)	9.00	9.50
PENNSYLVANIA—		
Bright Stocks (Pennsylvania Grade No. 8 color, 140-150 at 210, 545-550 flash)		
10 pour point		30.50
15 pour point		29.50
25 pour point	25.00	28.00
Steam refined:		
600	15.00	16.00
650	15.50	16.50
600 flash	16.00	17.50
630 flash	17.00	17.50

Neutral Oil

(Vis. at 100° F. except Pennsylvania and color N.G.A.)

OKLAHOMA (Group 3)—	
0-10 pour point:	
200-3	15.00
300-3	18.00
500-3	19.50
600-3	20.00

Note: Viscous neutrals, 10-25 pour, quoted 0.5 cent under 0-10 oils.

Neutral Oils

CALIFORNIA—		
Pale oils:		
200-2½-3	7.00	7.75
400-3-4	7.25	8.00
600-3-4	8.75	11.00
Red oils:		
200-4-5	7.00	7.75
400-5-6	9.00	11.00
500-900, 5-6½	9.25	11.25
GULF COAST—		
Pale oils:		
200-3	8.50	8.75
300-3	9.00	9.25
500-3½	9.75	10.00
750-3½	10.00	10.25
2,000-4	10.50	10.75
3,000-4	12.25	12.50

PENNSYLVANIA—	
150 vis. at 70° F., 3 color, 400-405 flash:	
Zero pour point	37.50
10 pour point	36.50
15 pour point	35.50
25 pour point	30.00
200 vis. at 70° F., 3 color:	
Zero pour point	39.50
10 pour point	38.50
15 pour point	37.50
25 pour point	32.00

WAX

(Cents per pound)

OKLAHOMA (Group 3)—	
124-126 (A.m.p.) w.c. scale	4.250
PENNSYLVANIA (inland refineries)—	
122-124 (A.m.p.) w.c. scale	4.250
124-126 (A.m.p.) w.c. scale	4.250
NEW YORK—	
Wax in bags fully refined:	
130-132 (A.m.p.) wax	5.850
133-135 (A.m.p.) wax	6.150
Crude scale:	
124-126 (A.m.p.) w.s.	4.250
124-126 (A.m.p.) y.s.	4.250

TANK-WAGON PRICES IN 50 CITIES

(Gasoline prices based on regular grades, tax included, undivided dealer)

ATLANTIC AND NEW ENGLAND
(Socony-Vacuum Oil Co., Inc., and Atlantic Refining Co.)

	Dealer tank wagon	Combined tax	Kero. tank wag.
Baltimore, Md.	15.95	5.50	10.50
Boston, Mass.	14.90	4.50	10.10
Burlington, Vt.	16.90	5.50	10.20
Buffalo, N. Y.	16.20	5.50	10.90
Dover, Del.	16.70	5.50	12.30
Hartford, Conn.	15.80	4.50	10.00
Manchester, N. H.	17.30	5.50	12.10
Newark, N. J.	15.20	4.50	10.00
New York, N. Y.	16.10	5.50	10.10
Philadelphia, Pa.	16.20	5.50	11.95
Pittsburgh, Pa.	16.70	5.50	12.30
Portland, Me.	16.30	5.50	10.20
Providence, R. I.	15.00	4.50	9.90
Washington, D. C.	15.20	4.50	11.30
Average 14 cities	16.02	5.14	10.85

(All prices undivided dealer basis.)

CENTRAL
(Standard Oil Co. of Indiana, Standard Oil Co. of Ohio, Continental Oil Co. and Texas Co.)

	Dealer tank wagon	Combined tax	Kero. tank wag.
Chicago, Ill.	13.40	4.50	10.30
Cleveland, Ohio	15.00	5.50	*9.00
Dallas, Tex.	13.00	5.50	7.00
Des Moines, Iowa	14.40	4.50	9.80
Detroit, Mich.	14.40	4.50	9.00
Fargo, N. D.	16.90	5.50	11.30
Huron, S. D.	16.30	5.50	10.70
Indianapolis, Ind.	15.20	5.50	9.80
Little Rock, Ark.	17.50	8.00	10.00
Milwaukee, Wis.	16.10	5.50	10.50
Minneapolis, Minn.	15.40	5.50	10.30
Omaha, Neb.	15.40	6.50	9.80
Tulsa, Okla.	16.50	7.00	8.50
Wichita, Kans.	12.70	4.50	8.00
Average 14 cities	15.15	5.57	9.61

*Includes 1-cent state tax.

SOUTHEASTERN
(Standard Oil Companies of New Jersey, Kentucky, and Louisiana)

	Dealer tank wagon	Combined tax	Kero. tank wag.
Atlanta, Ga.	18.90	7.50	*11.50
Birmingham, Ala.	18.50	8.50	9.00
Charleston, S. C.	18.95	7.50	.....
Charleston, W. Va.	19.25	6.50	13.30
Charlotte, N. C.	20.10	7.50	11.30
Jacksonville, Fla.	18.90	8.50	9.50
Jackson, Miss.	17.50	7.50	†9.00
Louisville, Ky.	16.50	6.50	8.50
Memphis, Tenn.	17.90	8.50	10.50
New Orleans, La.	17.75	8.50	*10.00
Norfolk, Va.	17.45	6.50	12.30
Average 11 cities	18.34	7.50	10.49

*Includes 1-cent state tax.
†Includes ½-cent state tax.

MIDWESTERN
(Continental Oil Co.)

	Dealer tank wagon	Combined tax	Kero. tank wag.
Albuquerque, N. M.	17.50	7.50	10.00
Boise, Idaho	20.10	6.50	16.50
Casper, Wyo.	17.00	5.50	12.00
Denver, Colo.	14.50	5.50	11.00
Helena, Mont.	17.00	6.50	13.00
Phoenix, Ariz.	18.50	6.50	12.50
Reno, Nev.	17.50	5.50	13.50
Salt Lake, Utah	18.50	6.50	14.50
Average 8 cities	17.58	6.25	12.88

PACIFIC COAST
(Standard Oil Co. of California)

	Dealer tank wagon	Combined tax	Kero. tank wag.
Portland, Ore.	17.00	6.50	13.80
San Francisco, Calif.	14.50	4.50	11.50
Seattle, Wash.	17.00	6.50	13.80
Average 3 cities	16.17	5.83	13.03
Average 50 cities	16.55	5.96	10.87

Sedimentary Rocks

(Continued from Page 71)

in the flysch beds and it is not yet definitely known whether it would or would not be highly successful.

Post-molasse sediments: In many cases the later molasse sediments are continental and of little interest to the geologist. In other cases they remain marine and grade into the normal type. In some cases, the section includes beds of granite wash which is a highly weathered arkose. The frequent interfingering of granite wash and limestones and dolomites shows that the rate of deposition was very slow and that chemical erosion was dominant over mechanical erosion in the area. Granite wash, therefore, belongs properly in the normal or quartzose suite of sediments and its presence is due to the presence of granite in the relatively flat land mass.

This article deals only with the classification of sediments and some of the properties resulting from primary processes. Secondary processes dealing with induration and chemical changes also have an important bearing on the properties of oil reservoirs. Limestones and dolomites have not been discussed. These subjects will be taken up in later articles.

Nor has there been any discussion of the way in which sediments may be studied or the way in which the results of these studies may be applied to finding, developing or producing oil fields. These also come later. This introductory article provides only the major concept upon which later work is based. There is one factor which is present in all geological studies which might be mentioned here. It does not involve the geologist himself, except indirectly. The geologist can generally handle a geological problem if given the necessary encouragement. His greatest need is not equipment or apparatus so much as it is for a non-news-conscious executive. If the geologist is compelled to drop a research problem and scout a hot wildcat or get into a hot play, most of the time spent on the research project will be wasted.

Lack of interruption is the first requisite for research.

Acknowledgments: In this and succeeding articles, free use will be made of the literature on sediments. In some cases, the opinions expressed by other writers have been blended into my own in such a way that no one could unscramble them. This is inevitable in any discussion of this kind. The authors quoted may also have valid objections to the conclusions expressed. This is also to be expected. It is intended in this series to present a working hypothesis only, not a complete working knowledge of the subject. It will take many years of work by hundreds of geologists before the complete structure will be built.

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W. A. J. M. van W. van der Gracht, The Permo-Carboniferous Orogeny in the South Central United States, Jour. of Geol., 1931, pp. 697-714.

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Appalachian

(Continued from Page 84)

SOUTHWEST PENNSYLVANIA

Fayette County.—On Chestnut Ridge in South Union Township, Fayette County, New Penn Development Co., William E. Snee et al are drilling at 8,425 ft. in No. 2 Indian Creek Coal Co. or 113 ft. in the Onondaga chert with no showing of gas or water. Here Peoples Natural Gas Co. is still fishing tools lost in the Onondaga in 1 Walters.

Westmoreland County. — On Laurel Ridge in Ligonier Township, Westmoreland County, New Penn Development Co., William E. Snee et al reached 8,136 ft. in 1 John and Eleanor Beck farm and in the Marcellus shale. On Chestnut Ridge, in Derry Township, Peoples Natural Gas Co. has reached 3,620 ft. in No. 1 Camilla Giffin.

SOUTHWEST PENNSYLVANIA COMPLETIONS

Clarion County, Monroe Township: J. Peterson 1 R. Irwin, dry, through Speechley sand, T.D. 2,702 ft.

Red Bank Township: Owens Illinois Glass Co. 2 L. J. Blotzer, 400,000 cu. ft. gas T.D. 1,061 ft.

Owens Illinois Glass Co. 1 J. S. Platt, 15,000 cu. ft. gas, through Bradford sand, T.D. 2,968 ft.

Greene County, Jefferson Township: Carnegie Natural Gas Co. 2 J. H. Moredock, 53,000 cu. ft. gas, Fifth sand 2,890-2,910 ft., gas 2,898-99 ft., Bayard 2,961-72 ft., gas 2,963 ft., T.D. 3,026 ft.

Indiana County, South Mahoning Township: Equitable Gas Co. 1 Joseph Wells, 400,000 cu. ft. gas, gas at 1,384 ft., T.D. 1,400 ft.

La.-Ark. Fields

(Continued from Page 84)

cu. ft. gas, open flow, R.P. 805 lb., T.D. 2,120 ft.

Union Producing Co. 65 Crossett Lumber, 14-21n-4e, 1,168,000 cu. ft. gas, open flow, 630 lb. R.P., T.D. 2,118 ft.

MISSISSIPPI

JACKSON, Miss.—California Co. 1 G. T. Smith, Lincoln County wildcat, ran swab to 7,500 ft. and recovered about 8 bbl. of oil per hour, with no salt water. It was reported the operators would move in pumping unit and complete the well as it stands. Total depth is 12,229 ft., plugged back to 10,461 ft., with perforations at 10,156-75 ft.

Kansas Fields

(Continued from Page 81)

Drach, Stafford County: Atlantic Ref. 4 Alpers, NE SW 7-22-12w, swabbed 60 bbl. an hr., Arbuckle 3,668-73 ft.

Ellis, Ellis County: Darby Pet. 2-A Bittel, W½ SW SE 31-12-20w, pumped 170 bbl., Arbuckle 3,824-39 ft.

Haller, Ellis County: J. H. Bloch 1 Warner, N½ NW NW 4-11-18w, dry, T.D. 3,573 ft., Arbuckle 3,568 ft.

Hunter, Saline County: Deep Rock 1 Reeves, NE SW NW 20-16-1w, pumped 67 bbl., Mississippi lime 2,676-80 ft.

Keesling, Rice County: Cities Service 1 Dimmett, NW NE 20-20-9w, dry, T.D. 3,380 ft., Arbuckle 3,347 ft.

Kraft-Prusa, Barton County: Phillips 1 Theisen, SW NW 14-16-12w, dry, T.D. 3,386 ft., Arbuckle 3,380 ft.

M. T. Springer et al 4 North Oeser, NE SW NW 30-16-11w, pumped 389 bbl., Lansing 3,067-72 ft.

Lindsborg, McPherson County: Winkler-Koch 1 Bean, approx. SE NW 25-17-4w, pumped 158 bbl. in 7 hr., Viola 3,395-3,400 ft.

Lost Springs, Marion County: Derby Oil 1 Rogers, W½ SE SE 9-17-4e, pumped 100 bbl., Mississippian chat 2,346-65 ft.

McLouth, Jefferson County: Apperson et al 2 Bower-McLaughlin, N½ SE NE 5-10-20e, pumped 35 bbl., Mississippi lime 1,624-32 ft.

E. V. Jackson 4 McLeod, NE NW SE 5-10-20e, pumped 50 bbl., Mississippi lime 1,625-46 ft.

Orth, Rice County: Bartlett & Crum et al 1 Appel, NE NE 21-18-10w, pumped 84 bbl., Arbuckle 3,210-44 ft.

Stark N, Pratt County: Lion Oil Ref. 2 Ford, NE NW SE 12-26-12w, dry, T.D. 4,161 ft., Viola 4,144 ft.

Stoltenberg, Ellsworth County: Magnolia 3 Schroeder, SE NE 33-16-10w, pumped 259 bbl., Arbuckle 3,264-85 ft., T.D. 3,388 ft.

Trapp, Russell County: Stanolind 4-A Letsch, S½ SE SE 4-15-13w, pumped 548 bbl., Lansing 3,000-20 ft., T.D. 3,135 ft.

Witt, Russell County: Coralena Oil 1-A Albert, SW NE SE 9-14-14w, pumped 761 bbl., Lansing 3,036-40 ft., T.D. 3,042 ft.

A. H. Witt 5-C fee, SW SE NW 3-14-14w, pumped 600 bbl., Lansing 2,991-3,000 ft.

FOREST CITY BASIN

ST. JOSEPH, Mo.—Two wildcat tests in the Forest City basin were dry the past week, one in Atchison County, Missouri, and the other in Brown County, Kansas. In Atchison County J. E. Palensky et al drilled 1 Edward White in an attempt to extend production 3½ miles southwest of the Cities Service 1 Cook well, a Bartlesville producer. But the Palensky well ran some 70 ft. lower than the producer and was bottomed at 1,502 ft., there being practically no Bartlesville sand. Elevation was 1,071.4 ft. and the base of Kansas City lime was at 960 ft. This is the second failure in the neighborhood of the producer. Earlier this spring a dry hole was drilled by O. R. Newcomer of St. Joseph, just 2 miles south of the well.

In Brown County, Kansas, Clifton Gall and Edwin Towle drilled 1 Amann in SW SW 18-3s-17e, 4½ miles south of Hiawatha, to the Hunton lime. This was topped at 2,668 ft., without oil.

NEBRASKA COMPLETION

Atchison County: J. E. Palensky 1 Edward White, SE SE SE 11-64n-40w, dry, T.D. 1,502 ft.

Equipment Progress

A New Republic Development

Republic Flow Meters Co. announces a new pneumatic differential pressure transmitter for measuring flow and level. The device is expected to find a wide market in chemical plants, oil refineries, and other process industries where fire and explosion hazards are present because it avoids the necessity of running long lines containing poisonous or explosive products.

The pneumatic device converts a differential pressure, such as is produced by the flow of a fluid through an orifice or by liquid level in a vessel, into an air pressure which varies proportionally with the differential pressure.

Ranges are available from 0.9 in. to 25 in. of water differential for working pressures up to 15 lb. per sq. in.; 7 in. to 50 in. of water for working pressures up to 25 lb. per sq. in.; and 13 in. to 800 in. of water for working pressures up to 600 lb. per sq. in. Ranges are very easily changed in the field with a minimum substitution of parts. The company can provide special heads for pressures up to 2,000 lb. per sq. in.

The device has shown unusual sensitivity and responsiveness. When a receiving instrument was installed adjacent to the transmitter, flow changes were shown almost instantly. With 500 ft. of ¼-in. o.d. tubing, the full value of the change registered in 15 seconds.

Effect of ambient temperature variations on the accuracy of this new Republic transmitter are said to be negligible. Tests have also shown that normal frequencies of vibration present in industrial and processing plants do not affect the device.

Double "E" for Triple "M"

The men and women of the Bridgeport works and the Boston works of Manning, Maxwell & Moore, Inc., have been awarded the Army-Navy "E" pennant for excellence in their war production. On April 19 the presentation of the award to the Bridgeport plant was held at Klein Memorial Auditorium, with the presentation of the Army-Navy "E" pennant made by Admiral Thomas C. Hart, U.S.N. (Ret.). The Boston plant presentation was held the following day at the Boston Arena, where the presentation of the Army-Navy "E" pennant was made by Rear Admiral Wat T. Cluverius, U.S.N. (Ret.). At both presentations the pennant was accepted by C. A. Moore, chairman of the board of directors of Manning, Maxwell & Moore, Inc.

The honor roll of the two plants showed nearly 800 employes who have left to join the armed forces. At the close of the ceremonies the men and women of both plants received their Army-Navy "E" lapel insignia.

Fourth "E" Award To Foster Wheeler

For the fourth time within a year, the "E" for excellence in production has been awarded to employes of Foster Wheeler shops by the Navy Department. In this instance a new Army-Navy "E" pennant "with star" was presented at the Dansville, N. Y., works, as indication of continued high production of war equipment on time.

Rear Admiral Clark H. Woodward, who conferred the original "E" award last August, presented the new burgee, as he had promised to do if the shops were successful in maintaining their high record for the second 6 months.

Acknowledgment of the award was made by Ellsworth Easton, president of Foster Wheeler Employes' Association, and he was followed by Captain Scherer who presented the token insignia to a man and a woman selected to represent the body of men and women who earned the star.

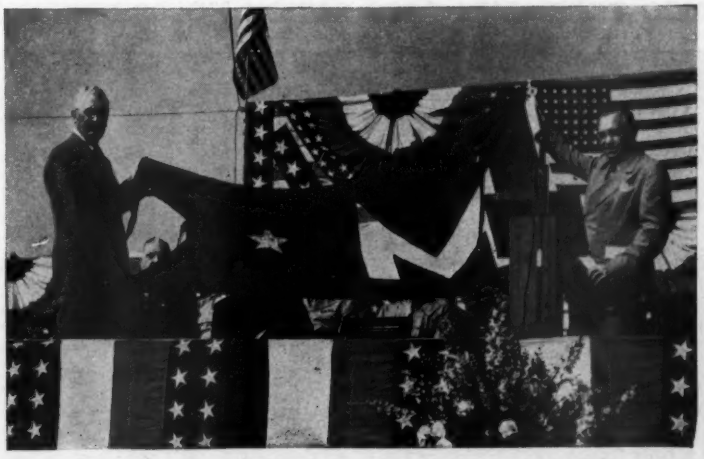
Ridge Tool Co. Moves Into Larger Quarters

Ridge Tool Co., Elyria, Ohio, has recently moved from its original factory site at North Ridgeville into completely remodeled and modernized plant and offices in Elyria. The new factory provides five times the working space of the old and permits greater manufacturing efficiency. A feature of the new offices is an attractive mural 22 ft. long by 3 ft. deep in the reception room, painted by Glenn Shaw of the Cleveland School of Art; it depicts the uses of Ridgid pipe wrenches, threaders, cutters and vises in many industries. Ridge Tool Co. is 20 years old this year.

Trade Literature

D. W. Haering & Co., Inc., 205 West Wacker Drive, Chicago, Ill.—A new fifth edition of the booklet, "Organic Methods of Scale and Corrosion Control." This 28-page discussion of organic methods presents the newest information on scale and corrosion control. Charts, graphs and photographs are liberally used. The booklet also devotes several pages to an explanation of causes of scale and corrosion, and introduces a new section tabulating the physical and chemical properties of the various glucosates developed by Haering.

BEAUMONT IRON WORKS AWARDED FLAGS



At a ceremony at the company's plant in Beaumont, Tex., on April 29, Leigh R. Sanford, Gulf Coast regional director of construction for the U. S. Maritime Commission, presented the Maritime Victory Fleet Flag and "M" Flag to Beaumont Iron Works Co.

A month prior to the Maritime

Commission awards, the Army-Navy "E" was presented to Beaumont Iron Works Co. and prior to that the company received the Treasury Flag for its employes' 100 per cent participation in the salary purchase plan for war bonds.

In addition to production of material for the U. S. Army, Navy and Maritime Commission, the Beaumont company is also producing considerable quantities of material for Frick-Reid Supply Corp. for use in the construction of high-octane aviation gasoline processing plants.

Moves to New Location

Engineering Service & Supply Co. has moved to 6614 Harrisburg Boulevard, Houston, Tex., according to a notice mailed out by Ed Howell and Red Bobbitt, of the company.

Among Equipment Men

Sullivan Machinery Co. Promotes Two

O. J. Neslage has been appointed general sales manager of Sullivan Machinery Co., Michigan City, Ind.

O. J. NESLAGE

J. N. ROLSTON

He has an extensive background in the application of all Sullivan equipment as the result of many years of experience with this company. He has served as manager of the company's Mexico City, Joplin, Salt Lake City and New York territories, which gives him a thorough knowledge of the mining, oil, construction and industrial fields.

J. N. Rolston has been appointed assistant general sales manager. Mr. Rolston has had 13 years of experience with the company, including 5 years as assistant general manager of the company's Canadian subsidiary.

R. R. Ridgway Receives Schoellkopf Medal

Raymond R. Ridgway, associate director of research for Norton Co., Worcester, Mass., was awarded the Jacob F. Schoellkopf Medal for 1943 at the meeting of the Western New York section of the American Chemical Society at Niagara Falls, May 20. Mr. Ridgway, who has his headquarters at the Chippawa, Ontario, plant of Norton Co., is the thirteenth recipient of the Schoellkopf Medal which is awarded annually by the Western New York section.

Mr. Ridgway has been with Norton Co. since 1922 and is recognized as one of the outstanding research men in electrochemistry. His record contains a long list of inventions and improvements in the design of electric furnaces for the production of abrasives. His outstanding accomplishment was the isolation and commercial production of boron carbide, the hardest known material next to the diamond. Boron carbide is used extensively in abrasive form as a substitute for diamond dust in drilling and lapping carbide dies and tools. It is also made in molded form and, because of its exceptional resistance to wear, it is used in nozzles for sandblasting and in contact points for gages and measuring instruments.

New Athey Shift

Athey Truss Wheel Co., Chicago, Ill., announces the promotion of Claude E. Matthews to the position of supervisor of service and parts. Mr. Matthews has been with the company since 1937 when he started as a factory serviceman and has had a broad contact with Athey "Caterpillar" distributors.

Mr. Matthews is a native of Colorado and attended University of Colorado as a student in mechanical engineering. For 6 years he was associated with Consumer's Co. of Chicago where he gained a wide knowledge in maintenance engineering work. He then served for a year with U. S. Engineers as an inspector in dredging work in the Great Lakes.

His experience with earth-moving equipment from a standpoint of both maintenance and repairs is being put to good use in the production of technical manuals for the various military services who are using Athey products.

PEMCO FOREMAN'S ASSOCIATION HOLDS DINNER AT PITTSBURGH, PA.

A dinner at Hotel Webster Hall in Pittsburgh, Pa., was recently sponsored by the Foreman's Association of Pittsburgh Equitable Meter Co. Officers of the company, department heads and invited guests were welcomed by Carl Dixon, plant superintendent, who served as master of ceremonies. Short talks were given by Colonel Rockwell, president, and other members of the supervisory force

Classified Advertising

The Market Place for the Oil Industry

UNDISPLAYED RATE

8 CENTS A WORD, minimum charge $2 per insertion.

SITUATIONS WANTED, 4 cents a word, minimum charge $1.

BOX NUMBERS, count 9 words when replies are to be sent to our Tulsa Office.

10% DISCOUNT if 3 insertions are ordered at one time, with check accompanying order.

Classified display advertising set in single or double column style:

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1 inch	13 times	6.50
1 inch	26 times	6.00
1 inch	39 times	5.50
1 inch	52 times	5.00

Rates are governed by total space used within 12 months from date of first insertion. Credits are allowed when lower rates are earned.

FORMS CLOSE MONDAY NOON—PUBLISHED EACH THURSDAY

HELP WANTED

INSTRUMENT Maintenance Men wanted. Preferably with oil refinery experience. Acquainted with Foxboro, L & N, Taylor, and Mason-Nielan instruments and controls. For new plant being built, location Texas Gulf Coast. Send photograph and complete experience record. Men now employed in war industries not considered. Box B-561, The Oil and Gas Journal, Tulsa, Okla.

WANTED MECHANICAL ENGINEER

With experience in design of oil well drilling and servicing equipment. Excellent opportunity for a man with creative ideas, ability and good personality. The person employed to fill this position will work under the Chief Engineer and will be responsible for all work in this field. Permanent position with major company located in the Southwest. State education, experience, age, draft status and other particulars, including recent photograph in first letter. Essential worker applicant must have war manpower commission certificate of availability. Box B-640, The Oil and Gas Journal, Tulsa, Okla.

PETROLEUM ANALYST

To analyze present and future markets for post war planning. Must have knowledge of oil industry including drilling and refining equipment, prospective new fields, all existing refineries and oil fields. Box B-630, The Oil and Gas Journal, Tulsa, Okla.

REFINERY EQUIPMENT MANUFACTURER

requires the services of man experienced in fabrication of heat exchangers and pressure vessels for supervisory position. Must know shop practices. Reply giving full details of qualifications. Box B-621, The Oil and Gas Journal, Tulsa, Okla. Applications from those now employed in war industries will not be considered.

NOTICE TO ADVERTISERS

Advertisers offering positions to workers skilled in critical war industries are requested by the War Manpower Commission to include the following sentence in their advertisement:

"Applications from those now employed in war industries will not be considered."

SITUATIONS WANTED

ACTIVE former Chief Engineer desires position as such in Oil or Gas Main Line station. For further particulars, write Box B-641, The Oil and Gas Journal, Tulsa, Okla.

MECHANICAL ENGINEER, now employed as superintendent of drilling and production. Have had 22 years of oil and gas experience, including executive capacity. Age 49, married and three children. Would like to make connection with substantial oil company. Will be available June 10. Box B-644, The Oil and Gas Journal, Tulsa, Okla.

FORMER Chief Executive of a large oil company, past fifteen years in oil business for self but forced out due to war conditions. Experienced in construction and operation of refineries, marine oil terminals and pipe lines. Also purchasing and working millions of barrrels of crude petroleum and its products. Box B-645, The Oil and Gas Journal, Tulsa, Okla.

GEOLOGIST: Twelve years experience in Texas and Oklahoma. Want job with headquarters in North Texas or Oklahoma. Class 3 Draft Classification. Married, one child. Box B-633, The Oil and Gas Journal, Tulsa, Okla.

PETROLEUM SALES ENGINEER available. Thoroughly familiar with petroleum jobber and automotive fleet operations. Eighteen years responsible background with Pennsylvania Refiner over wide area including Personnel, Distribution, Warehousing and Transportation problems. Some accounting. At present District Manager closely allied industry in Southwest. Age 42. 4-H Classification, Married. Box B-631, The Oil and Gas Journal, Tulsa, Okla.

PROCESS ENGINEER with 21 years experience in design, construction and operation of latest developments in casinghead plants and oil refineries, desires connection with refiner or manufacturer of refinery equipment. Box B-636, The Oil and Gas Journal, Tulsa, Okla.

ELECTRICIAN and Instrument man 12 years one refinery, 5 years steel mill maintenance and construction. Will go anywhere—foreign if possible. Box B-611, The Oil and Gas Journal, Tulsa, Okla.

PRODUCTION FOREMAN, twenty-three years' experience, flush and settled production, sand or lime formation, 300 ft. to 6500 ft. Age 43, family, class 3A(H). Immediately available. Box B-623, The Oil and Gas Journal, Tulsa, Okla.

SITUATIONS WANTED

OIL STATISTICIAN
TAX ACCOUNTANT
EXECUTIVE

Now employed as Secretary-Treasurer, oil producing company. Desire change of my own volition. Familiar with Federal and States Taxes, including Income, Declared Value Excess Profit Taxes, all Governmental and State reports pertaining to oil industry. Reorganizations under Federal Chandler Act, systems and accounting procedure, Production, Pipe Lines and Refinery branches, as well as Joint Interest ventures. Public Accounting experience. Desire permanent connection with substantial concern. Age 44, draft exempt. Post Office Box No. 2991, Dallas, Texas.

EXPLORATION

TORSION BALANCE geophysical surveys contracted. Very reasonable rates. Modern instruments, experienced, capable, torsion balance field personnel. Expert interpretations. Address: Christian Iden, Geophysicist, Box 1589, Willis, Texas, or 1740 Commerce Bldg., Houston, Texas.

FINANCING

CAPITAL SEEKERS—Interested in raising $25,000 or more for a legitimate project should write to AMSTER LEONARD, Fox Theater Bldg., Detroit, Mich.

FINANCING: Municipal, Industrial and Mining deals. Buyers obtained. Loans handled. No advance fee. Send details. Childs, Jeffries & Thorndike, Inc., 50 Broadway, New York.

LEGAL BLANK

OIL FIELD LEGAL BLANKS

Leases, assignments, releases, township plat books, well records, etc. Request on your letterhead gets free catalog. Olds Press, 218 East Third St., Tulsa, Okla.

THE BURKHART LINE of Legal Blanks Since 1908. Oil-Gas and Business Forms for Mid-Cont. and Illinois Basin. Leases Rev. with Gov.'s Regulations. Catalog and Samples. Burkhart Ptg. & Sta. Co., 115 So. Cincinnati, Tulsa, Okla.

INCORPORATION

DELAWARE CHARTERS: Powers broad, taxes low. Many of the largest corporations have Delaware charters. Complete service $35. Submitted forms. Chas. G. Guyer, Inc., Wilmington, Delaware.

ROYALTIES

ROYALTY and Leases, Ector, Refugio, McMullen and other counties. Map showing Ector royalty and Shell Sealy wells. Free circular. Anderson, 1014 South Cumberland, Dallas, Texas.

I OFFER production royalties in Osceola County, Michigan, low price, large monthly income. John Stouppas, 522 W. Broad Street, Columbus, Ohio.

¼ under 200 A. Cowley Co. Some production. H. Porth, Winfield, Kansas.

LEASES AND DRILLING BLOCKS

NEW MEXICO
State Oil and Gas Leases

Forty acres and multiples thereof, in a new HoT spot, 23 oil companies own surrounding leases. Write for information. No obligation. HARRY S. WRIGHT, New Mexico State Lessee, Farmington, N. M.

LEASES ROYALTIES

PRODUCING OR NONPRODUCING

Texas, New Mexico, Oklahoma, Louisiana and Illinois.

20 Years' Experience

Inquiries Invited.

B. D. BUCKLEY
60 Broadview Drive, Clayton
St. Louis, Mo.

(Continued on Next Page)

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Evansville Refining Co.
Evansville, Indiana

Titan Refining Company
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Complete stocks refining equipment, valves and fittings. Immediate delivery from our Tulsa Warehouse.

Refinery Equipment, Inc.

W. C. Berry
Union Ave. at 21st Street

Robert W. Duden
Tulsa, Oklahoma

FOR SALE: 300-13" OD, 8 thread, new casing couplings. 1—Gasoline Power Drilling Rig good for 3000'. Also Steam Drilling Rigs and pipe and casing of all sizes. We also purchase abandoned Leases, Refineries, pipe lines and other oil field equipment. If in need of material, or have material for sale, communicate with LOUISIANA IRON & SUPPLY CO., Shreveport, La., Phone 5223, or L.D. 1.

FOR SALE: 8000' or any part, Used 3-Conductor Electric Cable good condition for any service 1000 Volt or less. Price 25c to 45c per ft. Free sample on request. General Tool & Supply Co., Box 4387, Oklahoma City, Okla.

1500 BBL. Skimming Plant complete with pumps, lines, fittings, instruments, bolted storage tanks. To be dismantled and removed by buyer. SOVEREIGN REFINING COMPANY, 777 No. Washington, Saginaw, Michigan.

---

3 NEW U-9 International Power Units, complete with clutch and power takeoff. Utility & Industrial Supply Co., Jackson, Michigan.

FOR SALE: Many sizes, reconditioned safety and relief valves, also pressure and temperature, recording, controlling and indicating instruments. All repairs and workmanship guaranteed. McGatlin Instrument Co. 1612 Bryan Street, Dallas, Texas.

NEW power driven skid mounted piano wire winch, capacity 12,000 feet .072 line, 5 HP Briggs & Stratton Gasoline engine (without measuring device). $322.00. Box 5296, Dallas, Texas.

FOR SALE: Rotary Drilling Rig—Wilson Giant Drawworks, LeRoi 8 Cylinder Gas-Butane Engines, never run since rebuilt, choice 7¼" x 14" or 7¾" x 16" Lucey Pump, 120' Moore Derrick, outfit complete.

LUCEY PRODUCTS CORPORATION
Tulsa, Okla.

FOR SALE: 1 Buckeye #34 used ditching machine. H. L. GENTRY ENGINEERING COMPANY, Jackson, Michigan.

FOR SALE
READY TO GO—LOCATED AT OUR SAN FRANCISCO YARD
BOILERS
2—Washington 95 HP Vertical, 174 lb. California Code with all new fittings, bases and stacks.
COAST EQUIPMENT COMPANY
948 Bryant St. San Francisco, Calif.

Second hand Oklahoma City alloyed sucker rods, ¾", ⅞" and 1".
Have sold millions of feet with satisfactory results. I recommend these rods up to 4000 ft.

M. R. TRAVIS
1702 S. Boulder Tulsa, Oklahoma

FOR SALE—One partial list steam rotary equipment and approx. 2000' of 6⅝" O.D. Drill Pipe located near Coyle, Oklahoma, priced right to sell. Inquire T. T. Eason and Company, Enid, Okla.

FOR SALE: Complete slim hole rotary rig. Cardwell Drawworks, 7¼ x 12 Gardner Pump powered by 225 HP Waukesha Engine, 4200' of 3½" drill pipe, etc. Melton Machinery & Supply Co., Seminole, Okla.

FOR SALE—One complete steam rotary outfit less boilers, located near Coyle, Oklahoma, priced to sell. Inquire T. T. Eason and Company, Enid, Okla.

COMPLETE Winkler & Koch designed pipe still with Vapor Separator. Also complete line Series 150 valves and fittings, bubble towers, bends and heavy tubing. Omar Refining Company, Garber, Okla.

NO. 2 NATIONAL rig for sale, Wayne County, Kentucky. Ready to drill. Good condition. $1500.00 Bargain. Harold Hardwick, Burnside, Kentucky.

FOR SALE: Approximately 2000' of 16" OD 70# Lapweld casing, 8 thread, and approximately 750' of 16" OD 70# Seamless casing, Grade C, 8 thread, located in various parts of Kansas. HERMAN KAISER PIPE & SUPPLY CO., 916 Palace Bldg., Tulsa, Okla. Phone 3-3413. Night phone 8633.

2—STERLING Petrol 6 Cylinder Gas Engines rated 163 HP at 1800 Gas Engines Radiator Cooled direct connected to 125 KVA 100 KW 480 Volt 3 Phase 60 Cycle 1800 RPM Alternating Current Generators complete, engines have been completely overhauled. Phil A. Cornell, Oklahoma City, Okla.

FOR SALE at Chase, Kansas warehouse 8,000 feet 3" 9.30# 10V Thread Upset used Seamless Steel Tubing. Cities Service Oil Company, Patridge, Bartlesville, Okla.

FOR SALE: Slightly used—2-F-M 2-Cyl. Model 47—B.O. Diesel or gas engines, 1—7¼" x 14" G-D. Power Slush Pump. 3800 ft. 6⅝" Pittsburgh Special D.P. Hughes Joints.
1—Large 8" Emsco rotary rig with F-M Diesel power. Box B-646, The Oil and Gas Journal, Tulsa, Okla.

DRESSER COUPLINGS

For Sale

Immediate Shipment

125—20" Dresser Couplings complete with Rubber Rings and Bolts, perfect condition.

50—30" Dresser Couplings complete with Rubber Rings and Bolts, perfect condition.

BROWN-STRAUSS CORP.
Box 78, Kansas City, Mo.

FOR SALE

2 7"x8" Model VTO Troy Steam Engines DC to 8"x4" Model HQ 84-31 Kinney Rotary Pump, with strainers $850.00 each.
1 8"x8" Model VT Engine only, $450.00
1 #1A National Std 7'x22'6" Oil Gas Separator, $800.00.
1 Bessemer Roller Single Eccentric Pumping Power, $75.00.
1 17"x2"x15" Worthington DPP Steam pump 2500# WP 26 GPM $850.00.
1 14"x3"x14" Worthington DPP Steam pump 4000# WP 50 GPM, $650.00.
2 10"x14", 2 12"x14", 1 12"x16" Brownell Horizontal Steam Single Cyl. Engines, $400.00 each.
650 Railroad ties.
1 200' Loading Rack.
2 2½" Type MULT BJ 4 Stage Centrifugal Pumps on cast iron base, $350.00 each.

Patridge, Cities Service Oil Co., Bartlesville, Okla.

80,000 Bbl. Tank

All steel, cut down, rivets backed out and match marked. Ready for loading. Located Sunburst, Montana. Guaranteed A-1 condition in every respect.

Also 4—55,000 Bbl.

5 ring all steel tanks located in Okla. A-1 condition.

REFINERY EQUIPMENT, INC.
Union Ave. at 21st St. Tulsa, Okla.

FOR SALE: 160 HP Waukesha Gas Engines, O.C.S. 94 Rig Fronts, 50 HP Tico Gas Engine. 10 HP Fairbanks, Heavy-duty G.E. Motors and Generators, Rods, Walking Beams, Separators, Other equipment. Ad. Box B-642, The Oil and Gas Journal, Tulsa, Okla.

FOR SALE

Jumbo D Fort Worth Spudder, complete with P A 100 International Motor, V belt driven, mounted on skids, wire line, stems, bits, bailers from five inch to twelve inch.

CENTRAL STATES OIL CORP.
Box 148 Evansville, Indiana

HORIZONTAL TANKS

3—14,250 Gal. Cap. 9' x 30'
2—11,250 Gal. Cap. 8' x 30'
1—10,500 Gal. Cap. 10' x 17'
2—18,000 Gal. Cap. 10' x 30'

Located Illinois and Michigan

R. C. STANHOPE, Inc.
60 E. 42nd St. New York, N. Y.

PAINT CLOSEOUTS
IMMEDIATE SHIPMENT

5,000 gallons Rust Inhibitive Paint (Color: Red) Government specification ES 680. Excellent for priming and coating all exposed steel equipment. Made to withstand weathering and chemical conditions.
Packed in 54 gallon drums . . . only $1.25 per gallon.

4,000 gallons Light Gray Navy Paint. Made with titanium and pure linseed oils, dries to a hard durable finish. This fine specified product purchased from the surplus of a Navy contractor.
Packed in 54 gallon drums . . . only $1.50 per gal.

All prices quoted F.O.B. destination

Samples submitted upon request.

PAINT EXCHANGE OF CHICAGO
2256-74 Elston Ave. Chicago, Ill.

Classified Advertising

EQUIPMENT FOR SALE

162—3½" OD—6½" Centers—Chrome Key Headers
30—Pieces 3½" ID—4" OD—21' to 28' Long—Chrome Tubes
120—Pieces 3" ID—3½" OD—30' Long—Chrome Tubes
1—½" Shell 5' x 74'—4000 barrel cap. Crude Oil Fractionator with Trays
30—Pumps, various sizes and types

ARROW PETROLEUM CO.
FOREST PARK, ILL.

SUCKER RODS

25,000 ft. of ⅞" API Pin & pin high tensile rods just pulled from Oklahoma City wells. All in strictly A-1 condition.

AL BROWN KILGORE, TEXAS

EQUIPMENT WANTED

WANTED

Used Structural Steel
Pipe — Valves
Fittings
Send us your list

SONKEN-GALAMBA CORP.
108 N. 2nd St., Kansas City, Kansas

WANTED: PUMPS, CLOSE CLEARANCE, CAST IRON LIQUID END SIMPLEX

GPM	Suction	Discharge	Size
8	300	500	6½ x 3 x 8
11	300	550	6½ x 3 x 8
14	80	550	14 x 3 x 14
12	250	360	6½ x 3 x 8
28	300	360	6 x 5 x 12
28	300	360	6 x 5 x 12

Box B-601, The Oil and Gas Journal, Tulsa, Okla.

WANTED: Truck Load quantities of good used 5½" O.D. (4⅞" I.D.) Casing, threaded and coupled. Also 5" I.D. Line pipe or casing. Advise price and location. CENTRAL PIPE & SUPPLY CO., P. O. Box 1442, Lubbock, Texas.

EQUIPMENT WANTED: Magnetometer for oil prospecting. State price and condition. Box B-581, The Oil and Gas Journal, Tulsa, Okla.

WANTED: Good used centrifugal pumps 1", 1¼", 1½" and 2". Advise price and condition. CENTRAL PIPE & SUPPLY CO., P.O. Box 1442, Lubbock, Texas.

WANTED: One 3—3½ Ton Tractor Truck with 3000 gallon insulated tank trailer for transporting asphalt. Must be in A1- condition. TALCO ASPHALT & REFINING COMPANY, Mt. Pleasant, Texas.

WANTED TO BUY: Diesel Electric Plants from 15 KW to 60 KW AC 110-220. State full particulars. 1702 Transit Tower, San Antonio, Texas.

WANTED TO BUY
By reliable eastern marketer, operating refinery or part interest. State production particulars. Write P.O. Box 145, Hawthorne, New Jersey.

WANTED

Used storage tanks:
Pressure Tanks:
All sizes
Send us your list.

SONKEN-GALAMBA CORP.
108 N. 2nd St., Kansas City, Kansas

EQUIPMENT WANTED

WANTED: VESSELS
1—24" x 32' x ½"-⅝" Shell
2—30" x 12'-15' x 15/16"-1" Shell
1—24" x 50' x ⅜"-½" Shell with Bubble Plates.
Box B-602, The Oil and Gas Journal, Tulsa, Okla.

WANTED

Second-hand Oil Filling machines, 1 to 10 gallons capacity, Crandall or Clevon type preferred. Address Box B-643, The Oil and Gas Journal, Tulsa, Okla.

WANTED

COMPLETE Plants, Pipe-Lines, and Industrial Enterprises bought for cash or liquidated for the owners. Wire, phone, or write—INDUSTRIAL SUPPLY & EQUIPMENT CO., INC., 1044 Canal Bldg., New Orleans, La.—MA 5586.

PATENT ATTORNEYS

PATENTS, Trade-Marks, Booklet, "General Information Concerning Inventions and Patents" and "Free Schedule" sent without obligation. Established 1915. Lancaster, Allwine & Rommel, Suite 418, Bowen Bldg., Washington, D. C.

MONEY RAISING

WANTED: Working capital. Have geological data indicating probable location of several Gulf Coast salt domes or structures. Additional torsion balance stations necessary to correlate data to prove or disprove existence. If you have the money to invest and would be interested in discovering new oil reserves on a participating basis, address: Christian Iden, Geophysicist. Box 1589, Willis, Texas, or 1740 Commerce Bldg., Houston, Texas.

BUSINESS OPPORTUNITIES

HIGH GRADE FULLERS EARTH DEPOSIT. Very extensive and shallow overburden. On Railway and highway, centrally located to main refining districts. Clay suitable for mineral oils and as catalyst. Sale or royalty. Experienced operation engineer available. Advertiser, 210 Cotton Exchange Bldg., Memphis, Tenn.

ATTENTION: Owners of stripper wells. I can cut your expenses, increase your production, and operate your wells at a profit. Will take my pay out of increase in production. For full information address. Paul M. Sieck, 207 South Fannin Street, Tyler, Texas.

Canadian Fields

(Continued from Page 83)

rel previously paid for the unconditioned product. Cannar Oils, subsidiary of the Canadian National Railways, will sell its production to the conditioning plant on the same $1.25 basis. The 14 producing wells in the field, some of which have been shut in since last November, have a potential of around 300 to 350 bbl. daily, while considerable crude has accumulated in sumps.

Ontario.—In Elgin County, Ontario, Empire Oil Royalties of Toronto is continuing operations in the old Dutton shallow field, in Dunwick Township 22 miles west of St. Thomas. The field, originally opened in 1898, got its production in the Delaware and Onondaga limestones and had a peak output of 21,483 bbl. in 1903, but has been off production for more than 10 years. The Empire company is cleaning out and reconditioning a group of 59 abandoned wells. Some 14 wells have already been put in shape, and on an initial 1-day test with six wells linked to a central pumping plant some 16 bbl. of crude were pumped. Operations are being continued.

New Brunswick.—In the province of New Brunswick, a special committee named by the city of Moncton is securing an engineer to investigate the possibility of increasing oil and gas production on the holdings of New Brunswick Gas & Oilfields in Albert and Westmoreland counties. The company has a substantial but declining natural-gas field with a small oil production in the Stony Creek area. Oil production in 1942 increased to around 32,725 bbl., but gas production fell off. Deep drilling operations, financed jointly by the federal and provincial governments, have been started to test the theory that there is oil at lower horizons. The theory has been given support by the discovery, in diamond drill tests at Rosevale and Albert Mines, of oil-bearing sandstone not merely near the surface but in some of the cores, indicating that the oil-bearing strata underlie the entire Stony Creek basin.

Crude-Oil Prices

Representative selected crude prices from all sections of the country appear below:

East Texas	$1.25
Conroe	1.43
Tepetate, Louisiana	1.18
Illinois basin	1.37
Pecos County, Texas	.95
Bradford, Pennsylvania	3.00
Van, Van Zandt County, Texas*	1.08

*No change since 5-21-41.

Gravity Schedules

Top prices include all gravities above grades designated, and low prices include all gravities below grades designated:

Gravity—	Signal Hill, Calif.	Oklahoma, Kansas	Gulf Coast Texas	West Texas*
18-18.9	$0.80	....	....	....
19-19.9	.84	....	$1.06	$0.70
20-20.9	.88	$0.85	1.08	.72
21-21.9	.92	.87	1.10	.74
22-22.9	.96	.89	1.12	.76
23-23.9	1.00	.91	1.14	.78
24-24.9	1.03	.93	1.16	.80
25-25.9	1.07	.95	1.18	.82
26-26.9	1.11	.97	1.20	.84
27-27.9	1.15	.99	1.22	.86
28-28.9	1.18	1.01	1.24	.88
29-29.9	1.20	1.03	1.26	.90
30-30.9	1.23	1.05	1.28	.92
31-31.9	....	1.07	1.30	.94
32-32.9	....	1.09	1.32	.96
33-33.9	....	1.11	1.34	.98
34-34.9	....	1.13	1.36	1.00
35-35.9	....	1.15	1.38	1.02
36-36.9	....	1.17	1.40	1.04
37-37.9	....	1.19	1.42	1.06
38-38.9	....	1.21	1.44	1.08
39-39.9	....	1.23	1.46	1.10
40 and above	....	1.25	1.48	1.12

*Includes Lea County, New Mexico.

Journalisms:

HOW an estimated recovery of about 30 per cent of the oil in place at Shuler, Arkansas, was increased to practically 50 per cent by unitized pressure maintenance is the subject of an article by George R. Elliott, Phillips Petroleum Co., scheduled for next week's Engineering and Operating Section. It is significant that in this field pressure maintenance operations were not started until about one-half of the primary production had been recovered. Detailed permeability profiles make this article an outstanding contribution to the important field of reservoir engineering.

BATCHING shipments of different grades of crude or of different products has necessitated filling in the gaps between loops in looped lines in some instances. How other companies are able to prevent contamination on flowing batches through looped lines will be described by The Journal's pipe-line editor in next week's issue.

THE first installment of a series dealing with the desulfurization and sweetening of crudes, distillates and gases will appear next week. This series covers in detail the chemistry of each process and is particularly timely considering the likelihood of increased use of sour crudes in meeting the demand for oil.

ONE of the many problems in distillate operations is to evaluate fairly accurately the productive characteristics of the wells so that the feasibility of cycling in an area or the relative contribution of individual wells to a whole project can be determined. This usually is done by small-scale sampling and testing devices, of which there are many different types now in use. Because of the wide range of variables involved in sampling of two-phase gases, there has been little uniformity in the determinations by the different devices. To correct this situation, the High Pressure Gas Division of the Natural Gasoline Association of America, through its technical committee, has been attempting to work out a basis or method for standardizing the results obtained by these devices. The progress of this work, which is being carried on by practical field tests, will be presented in an article in an early issue of The Journal.

GRAVEL-PACKED liners to prevent slumping of the formation and plugging are commonly used. This process has been varied by a New Mexico operator in that the hole is gravel-loaded to a point above the caving section and the oil is pumped from above this level. Every well so treated thus far has responded with increased production which has been maintained. The procedure followed will be described in a staff article in the June 10 issue.

IT is characteristic of American optimism that, while the nation is at grips with powerful enemies in the toughest war it has ever had to fight, its citizens are already looking beyond the war to the shape of things to come in the postwar period. Manufacturers and industrial designers are painting vivid pictures of flivver planes in every garage, and a host of other Utopian advances that are exciting to the imagination.

AT least one industry has sounded a warning that maybe the pictures that are being held up to public view are too rose-colored. This industry is radio. Fearful that the public is being led to expect too much, solemn warning has been issued that the postwar receiving set will be much the same as it is today, and that too much should not be expected. Representatives of the automobile industry have pointed out that the only people who are not planning the postwar car are the automotive engineers. The oil industry has struck a happy medium with regard to fighting the war and planning for the postwar world. It has approached the situation with intelligence and keen insight. We'll be giving you the details soon, in the pages of The Journal.

THROUGH oversight, acknowledgment was omitted in last week's Journal that the article "Problems in Connection With Protection of Bare Pipe" by W. H. Stewart was presented before the Houston meeting of the Petroleum Industry Electrical Association.

CALENDAR

June

PENNSYLVANIA GRADE CRUDE OIL ASSOCIATION, twentieth annual meeting, Pittsburgh, Pa., June 25.

September

AMERICAN CHEMICAL SOCIETY, petroleum division, fall meeting, Septemper 6-10. Place of meeting not yet determined.

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